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LANDSCAPE-LEVEL WATERSHED ANALYSIS

An Experience Report from BLM Districts in Western Oregon

March 1994



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PRELIMINARY TRACKING PROCESS
LINKING PROPOSED ACTIONS TO WATERSHED ANALYSIS

EXTERNAL ACTION PROPOSAL

EXTERNAL ACTION PROPOSAL
(Developed by Core Team)

FORM CORE TEAM

(Review period, usually 6 months)

APPENDIX G

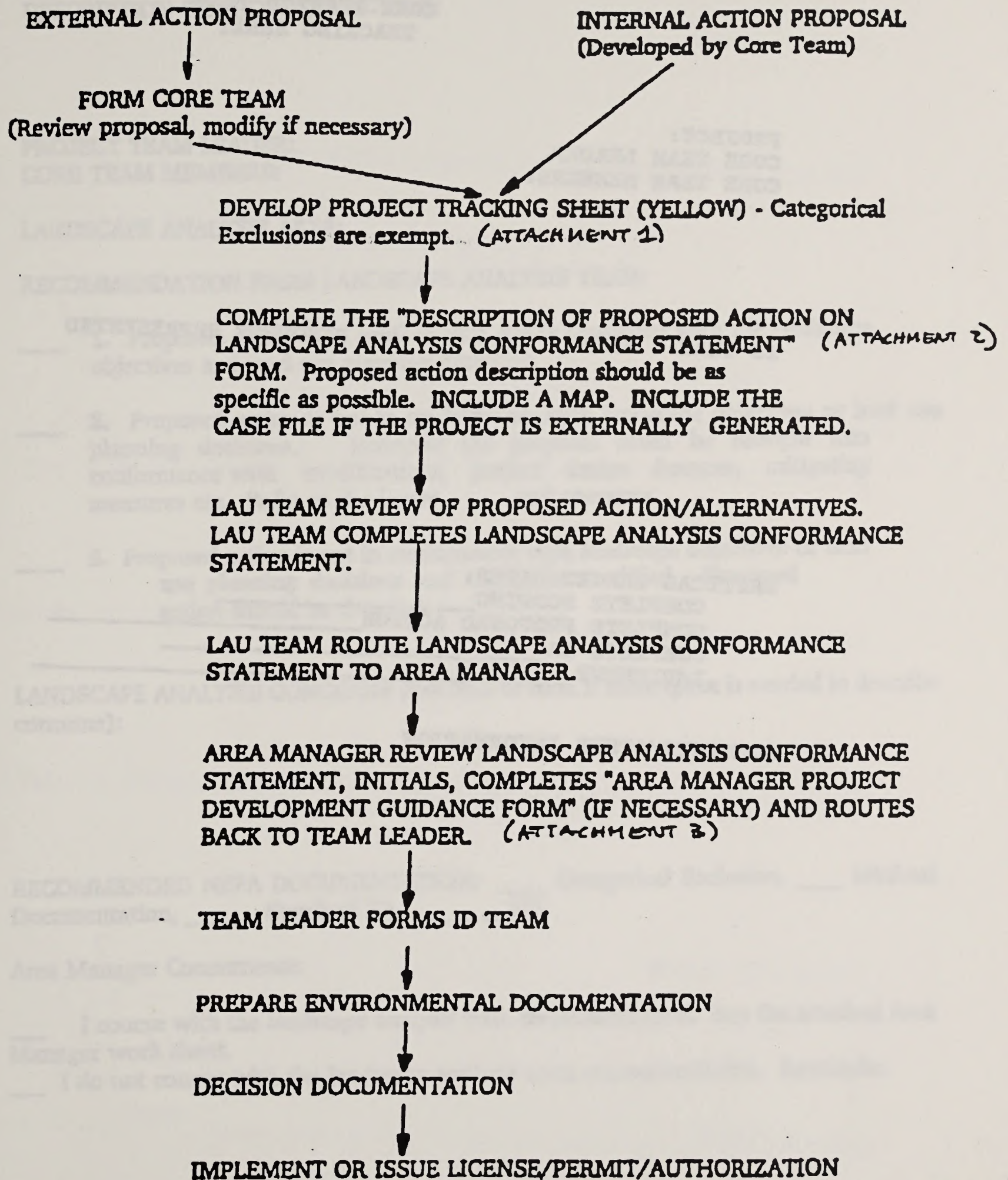
Preliminary Tracking Process Linking
Proposed Actions to Watershed Analysis
From Glendale Resource Area,
Medford District

APPENDIX C

Measuring the Impact of
Proposed Actions to Watershed Analysis
from Climate Resources Area
Methodology

APPENDIX F

PRELIMINARY TRACKING PROCESS LINKING PROPOSED ACTIONS TO WATERSHED ANALYSIS



**CORE TEAM/ID TEAM
TRACKING SHEET**

PROJECT:
CORE TEAM LEADER
CORE TEAM MEMBERS:

ID TEAM NAME

RESOURCE REPRESENTED

CRITICAL TARGET DATES:

COMPLETE SCOPING _____

COMPLETE PROPOSED ACTION _____

COMPLETE EA _____

IMPLEMENT _____

COMMENTS/OTHER INFORMATION

LANDSCAPE ANALYSIS CONFORMANCE STATEMENT

DESCRIPTION OF PROPOSED ACTION:

PROJECT TEAM LEADER:
CORE TEAM MEMBERS:

LANDSCAPE ANALYSIS AREA:

RECOMMENDATION FROM LANDSCAPE ANALYSIS TEAM:

- ☐ 1. Proposed action is in conformance and is consistent with the landscape objectives and land use planning decisions.
- ☐ 2. Proposed action is not in conformance with landscape objectives or land use planning decisions. However the proposal could be brought into conformance with modifications, project design features, mitigating measures etc. Refer to the issues and concerns.
- ☐ 3. Proposed action is not in conformance with landscape objectives or land use planning decisions and cannot be modified. Proposed action should be dropped.

LANDSCAPE ANALYSIS CONCERNS (use back of form if more space is needed to describe concerns):

RECOMMENDED NEPA DOCUMENTATION: ☐ Categorical Exclusion, ☐ Minimal Documentation, ☐ Standard EA, ☐ EIS

Area Manager Concurrence:

☐ I concur with the landscape analysis team recommendation. See the attached Area Manager work sheet.

☐ I do not concur with the landscape analysis team recommendation. Rationale:

AREA MANAGER PROJECT DEVELOPMENT GUIDANCE

Proposed Action:

PROJECT SPECIFIC LAND USE PLANNING GUIDANCE:

PROJECT SPECIFIC LANDSCAPE GUIDANCE:

SPECIFIC RESOURCE MANAGEMENT OBJECTIVES FOR THIS PROJECT:

SPECIFIC PROJECT DESIGN FEATURES OR MITIGATING MEASURES TO BE USED:

OTHER MANAGEMENT CONCERNS (RESOURCE, POLITICAL, PEOPLE, BUDGETS ETC.)

OTHER DIRECTION:

AREA MANAGER _____

DATE _____

APPENDIX H

Interagency Preparation Plan
for the Nestucca Basin Watershed Analysis

PREPARATION PLAN

for

NESTUCCA BASIN WATERSHED ANALYSIS

Scope of Analysis

INTRODUCTION

This preparation plan has been written to provide members of the Nestucca Basin Watershed Analysis Team with basic guidance and direction in completing the project. It clarifies the scope of the project, issues that apply, objectives to consider and procedures to use as the project is accomplished. It is assumed that the Record of Decision on the Forest Plan will supercede the FEMAT report, and appropriate adjustments will be made to objectives, procedures etc. in this analysis as needed.

DESCRIPTION OF PROJECT

Background: For the past several years, both the BLM and USFS have been changing to Ecosystem Management as a primary method of resource planning. Following President Clinton's Forest Summit, a report titled, "Forest Ecosystem Management: An ecological, economic, and social Assessment" was issued by the "Forest Ecosystem Management Assessment Team (FEMAT) in July 1993. This report was appendix A to the "Draft Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl". The FEMAT report, as it is commonly referred to, stated the "Federal agencies are expected to develop plans (jointly, where multiple agencies are involved) for the Adaptive Management Areas(AMA). The Nestucca Basin Watershed Analysis (Part of the North Coast AMA) began as the first joint effort to meet that expectation. In February 1994, the "Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl" was published, and contained all relevant and applicable standards and guidelines from the FEMAT report, effectively superceding it. The Record of Decision on the FSEIS will implement the FSEIS.

Analysis Area

This watershed analysis will cover all of the tributary watersheds to the main stem of the Nestucca river. It will analyze all BLM and USFS lands within the basin, also considering resource conditions and planned management on all other ownerships. It will not include other rivers entering Nestucca Bay (i.e. Little Nestucca River) or small tributaries entering directly into the Pacific Ocean. Specific subwatersheds to be included in the analysis are shown on the map passed out in the first team meeting.

Scope of Analysis

The analysis will be limited to evaluating current condition based on available data, recommending desired future conditions based on the FSEIS and agency planning documents, Identifying

data gaps and monitoring needs, and recommending management opportunities that will assist in achieving the desired future condition in accordance with the FSEIS and the planning documents. While potential project level activities may be identified in the management opportunities, this analysis is not intended to provide project level detail. That would occur in subsequent project level Environmental Analyses should management decide to proceed with the opportunity.

OBJECTIVES

BLM Resource Management Plan/USFS Land Management Plan objectives:

All objectives of the Salem District RMP and the Siuslaw National Forest Land Management Plan will apply.

General objectives:

- * As the site specific tool used to implement the FSEIS/ROD and the RMP/LMPs, the document will serve as the line managers' implementation strategy.
- * Identify the first five years of potential projects
- * Develop a systematic process of scheduling and implementing future projects and land treatments
- * Identify appropriate monitoring criteria and develop a systematic process of scheduling and implementing monitoring.
- * General objectives from the FSEIS will apply.
- * Proceed under the assumption that Alternative 9 will be selected, but be adaptive to changing guidance and understand that if the final decision varies from Alternative 9, the analysis would have to be adjusted.
- * Keep the document clear, concise and readable to the public.
- * Across the landscape, feature a variety of habitats which will provide for and maintain the viability of all species.
- * Develop a process to determine Riparian Management Area widths.

FSEIS highlights

Note to Team Members/participants: These are brief and paraphrased and are provided only to remind you of some of the important points to consider in preparing the watershed analysis. You MUST READ the FSEIS to get the entire accurate message of where we need to go from here!

- * The guidance for Late-Successional Reserves within the...Northern Coast Range Adaptive Management Area was changed. AMA plans may modify LSR designation or management, but must continue to meet the emphasis of these AMAs, which is restoration and maintenance of late successional forest habitat, riparian habitat and marbled murrelet habitat. Maximum age for thinning in North Coast AMA raised to 110 years. (pgs S-2 and B-61)
- * Management activities will be in accordance with the land allocations, and the standards and guidelines prescribed in the selected alternative (pg 2-18)
- * The adaptive management concept applies to all lands administered by the USFS and BLM, but the Adaptive Management Areas are specific land allocations (pg 2-12)
- * The primary objective of the AMAs is the development and testing of new approaches for integration and achievement of ecological and economic health, and other social objectives. (pgs 2-12 and 2-61)
- * Watershed analysis will focus on collecting and compiling information within the watershed that is essential for making sound management decisions. It will be an analytical process, not a decision-making process with a proposed action requiring NEPA documentation. (pg 2-16)
- * The participation in watershed analysis of adjacent landowners, private citizens, interest groups, industry, government agencies, and others will be promoted. (pg 2-18)
- * Watershed analysis will be an information gathering and analysis process, but will not be a comprehensive inventory process. (pg 2-18)
- * Timber harvest is prohibited in occupied marbled murrelet habitat at least until completion of the recovery plan. (pg-2-28)
- * Standards and Guidelines for riparian reserves would prohibit or regulate activities not designed specifically to maintain and restore the structure and function of the reserve and benefit fish habitat. (pg 2-28)

- * Roads would be managed to reduce sediment delivery to streams (pg 2-28).
- * Thinning in LSRs is to be beneficial to the creation and maintenance of late-successional forest conditions. Examples of silvicultural treatments that may be considered beneficial include thinnings in existing even-ages stands and prescribed burning. For example, some areas within LSRs are actually young single species stands. Thinning these stands can open up the canopy, thereby increasing diversity of plants and animals and hastening transition to a forest with mature characteristics. (pg 2-60/61)
- * Adaptive Management Areas are expected to produce timber as part of their program of activities consistent with their specific direction under the selected alternative. Strategy should contain a short-term (3-5 year) timber sale component and an assessment of long-term outputs of timber. (pg B-57)
- * The LSR designation for Marbled Murrelet in the North Coast AMA and/or the standards and guidelines for LSRs may be reconsidered in the AMA plan. Relaxation of the LSR status is not necessarily assumed; the proposals will require careful analysis...(pg B-61)
- * Riparian protection in AMAs should be comparable to that prescribed for other federal land allocations (pg B-144)
- * Riparian Reserve widths could be adjusted if results of watershed analysis demonstrate that adjustment is appropriate. (pg 2-30)
- * Riparian Reserve scenario 1 (see pg 2-62) will be applied on intermittent streams. (pg B-144)
- * The intent of course woody debris, green tree and snag retention guidelines specified for matrix forests must also be met in the AMA, but specific standards and guidelines are not prescribed for the AMAs. (pg B-145,146)

ASSUMPTIONS

All assumptions will be clearly identified in the analysis to enhance understanding by the team and the public and to facilitate completion of the project.

ANALYSIS FORMAT AND PROCESS

The primary guidance that will be used is "A Federal Agency Guide for Pilot Watershed Analysis, Version 1.2 dated January 1994." However, over the past year there have been numerous other samples of watershed analyses, and even more memos identifying procedures for completing analyses which may be utilized as tools to help in completing the best possible analysis possible.

ISSUES AND CONCERNS

Since Issues and concerns are identified in Step 1 of the analysis process they will not be duplicated in this preparation plan. It is important to involve the public in finalizing the issues, and that it be done early in the process to keep focus on direction that the analysis takes.

PROJECT ORGANIZATION AND MANAGEMENT

Team organization

The team consists of two co-team leaders, a CORE ID team and support specialists from BLM, USFS and several other federal agencies. The specific make-up of the team is found in attachment 1. The identified team members/support specialists are already committed by management to support the effort as needed. Other personnel may be needed on an occasional basis.

Team Leader responsibilities:

The co-team leaders will provide the primary oversight for team production, assuring schedules are developed, processes are followed, communication is maintained between all parties involved, and problems are resolved. They will develop processes that will provide desired products in the most efficient manner. They will be the primary contacts for the public and management in dealing with team matters. They will handle budget and personnel matters pertaining to the project. They will keep management informed of progress and problems. They will issue appropriate assignments and request appropriate support.

Core team responsibilities: Members of the Core team, other than the other agency representatives, will be responsible as lead writers for their assigned specialty areas. They will be responsible for coordinating with support specialists to obtain information and conduct analysis. Core team members will be the primary Interdisciplinary team for the project. The EPA, USFWS and NMFS Core team members will primarily have a coordination role, but will provide appropriate information to the lead writers as needed. The Core Team will follow analysis processes and procedures set forth in this preparation plan.

Support Specialist responsibilities: They will be responsive in providing information as requested by the Core team. They will assist the Core team in identifying issues, identifying current condition, defining desired future condition, and recommending restoration projects. They will follow analysis processes and procedures set forth in this preparation plan.

Management oversight: Management will provide oversight as needed and have empowered the Co-team leaders to complete the project in accordance with the Nestucca Basin Watershed Analysis

CHARTER

For the approved charter see attachment 2

COORDINATION AND REVIEW

Coordination and review will be primarily the responsibility of the CORE team, to involve all appropriate publics and agencies as appropriate and at whatever stages are appropriate. Review of the final document will be accomplished with the various interagency review teams in accordance with the Forest Plan record of decision.

PUBLIC PARTICIPATION PLAN

A separate public participation plan has been prepared. This plan will be used as the general direction for public participation, realizing that it is adaptive and will evolve throughout the process since this project is breaking new ground in the area of public involvement in federal forest management activities.

SCHEDULE

Due to the unusual nature of this project, its scope, its size, the involvement of several agencies and the public, and the continual change coming from higher levels of our agencies, a firm schedule is difficult. However, since it has been selected as a "Fast Track" Pilot Watershed, we must be completed within 6 months, and NLT 30 Sep 94 under any circumstances. General target dates for completion of analysis steps are shown below. Other due dates for specific assignments will be determined by the team leaders and assigned during core team meetings.

General Target Dates

Steps 1,2 and 3 concurrently - completed	1 May 94
Steps 4,5 concurrently - completed	30 Jun 94
Steps 6,7 concurrently - completed	30 Aug 94
Analysis completed & ready for review	30 Aug 94
Various reviews and approvals - completed	30 Sep 94

MANAGEMENT APPROVAL

Following completion of the watershed analysis, it will be presented to the three managers for their concurrence, asking for their direction on proceeding, or not proceeding, with the various management opportunities, proposed restoration projects and monitoring activities.

TEAM PROCESSES

Meetings:

Meeting times, and meeting attendees will vary widely through the course of the project. They will be identified by the Team Leaders and the Core team as needed. Meetings will be held only when specific needs exist to avoid wasting time. Those asked to attend specific meetings should notify one of the co-team leaders if they cannot attend.

Record retention

All team members will assure that official records, correspondence, final maps etc. are properly filed or cross referenced in official files. One complete set of appropriate official records will be maintained at both Tillamook Resource Area Office and the Hebo Ranger District Office. What is included in these files will be determined by the co-team leaders at the conclusion of the project. Not every single item will necessarily need to be maintained at both locations. Drafts, personal notes and working copies of maps will be destroyed when no longer needed.

Information protection/FOIA

Sensitive information, materials and maps will be protected by team members in accordance with agency guidelines. FOIA requests will be routed through agency FOIA coordinators.

Dealing with non-federal lands in the basin

The analysis of non-federal lands will be accomplished concurrently with the federal lands. Cooperation with landowners will be solicited. Team members may be tasked with making generalized resource assumptions regarding private lands based on existing data bases or photographs. Analysis of private lands will be sufficient to analyze the entire ecosystem. No management opportunities will be identified for private lands except those agreed upon with landowners during the analysis.

PRODUCTS

The following products will result from the analysis:

- Implementation strategy
- Riparian Zone Identification and/or process
- Implementation schedules
- Monitoring Guidelines
- Potential restoration projects
- Documentation and Tracking of the analysis process

Jan 18, 1994

NESTUCCA RIVER BASIN ID TEAM

CORE TEAM

CO-TEAM LEADERS

Chuck Hawkins	BLM - Tillamook	842-7546
Wayne Patterson	USFS - Hebo	392-3161

USFWS REPRESENTATIVE

Rachel Miller	USFWS - Portland	231-6179
	FAX	231-6195

EPA REPRESENTATIVE

Tom Robertson	EPA - Portland	326-7024
	FAX	326-3399

NMFS REPRESENTATIVE

Michelle Day	NMFS - Portland	230-5506
	FAX	231-2376

AQUATIC/FISHERIES

Val Crispin	BLM - Tillamook	842-7546
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TERRESTRIAL/WILDLIFE

Steve Bahe	BLM - Tillamook	842-7546
------------	-----------------	----------

SOILS/HYDROLOGY/GEOLOGY

Bob McDonald	BLM - Tillamook	842-7546
Chris McDonald	USFS - Hebo	392-3161

INFO.MGT./GIS

Dan Johnson	USFS - Hebo	392-3161
-------------	-------------	----------

SILVICULTURE/VGT.MGT./ECOLOGY

John Caruso	BLM - Tillamook	842-7546
-------------	-----------------	----------

WRITER-EDITOR/TECH.COORDINATOR/TRANSPORTATION MGT

Lynn Trost	BLM - Tillamook	842-7546
------------	-----------------	----------

OTHER SPECIALISTS PROVIDING INPUT - GENERALLY PART TIME

SOIL CONSERVATION SERVICE

Steve Rychetsky	SCS - Tillamook	842-2848
-----------------	-----------------	----------

OTHER SPECIALISTS PROVIDING INPUT - CONTINUED

AQUATIC/FISH

Tim Livengood	USFS - Hebo	392-3161
Bob Metzger	USFS - Corvallis	750-7055

SOILS/HYDROLOGY/GEOLOGY

Chester Novak (Hydrol.)	BLM - Salem	375-5626
Courtney Cloyd (Geol.)	USFS - Corvallis	750-7154

INFO.MGT./GIS

Bruce Ahrendt	BLM - Salem	375-7972
Gregg Kirkpatrick	BLM - Tillamook	842-7546
Cal Wettstein	USFS - Corvallis	750-7189
Mark Koski	BLM - Salem	375-5604

PUBLIC INVOLVEMENT ADVISORS

Marjorie Victor (Econ.Anal.)	USFS - Corvallis	750-7080
Cynthia Leonard	USFS - Corvallis	750-7012
Bob Wujcik (Cultural Res.)	USFS - Hebo	392-3161

RECREATION/LANDS

Scott Abdon (Rec.Planner)	BLM - Salem	375-5610
Nancy Craft (Rec.& Lands)	USFS - Hebo	392-3161
Al Grapel (Landscape Arch)	USFS - Corvallis	750-7050

RESEARCH COORDINATOR/MONITORING

Walt Kastner	BLM - Tillamook	842-7546
Stuart Johnston	USFS - Mapleton	268-4473

SILVICULTURE/VGT.MGT./ECOLOGY

Katie Grenier (botany)	USFS - Corvallis	750-7057
Jane Kertis (ecology)	USFS - Corvallis	750-7192
John Kwait (fire)	USFS - Corvallis	750-7026

TERRESTRIAL/WILDLIFE

Carol Bickford	USFS - Hebo	392-3161
Gary Licata	BLM - Salem	375-5686

TRANSPORTATION PLANNING

Vern Hallenbeck	USFS - Hebo	392-3161
Chuck Hurliman	BLM - Tillamook	842-7546

NESTUCCA BASIN WATERSHED ANALYSIS CHARTER

PURPOSE: To complete a watershed analysis of the Nestucca Basin in compliance with FEMAT, and consistent with agency land use plans. It will cover all resources of the ecosystem and results will be clearly documented.

PERSONNEL: The project will be led by Co-Team leaders Wayne Patterson (USFS) and Chuck Hawkins (BLM). The interdisciplinary team will be assigned from various BLM, USFS and other federal agency staffs as needed, and will be identified in the Preparation Plan.

GENERAL AUTHORITIES AND REPORTING RELATIONSHIPS: The team leaders will work together in this interagency effort under the authority of the three line managers having jurisdiction within the Nestucca Basin, specifically; Don Gonzalez (Hebo District Ranger), Dana Shuford (Tillamook Area Manager) and Dick Prather (Yamhill Area Manager). The team leaders are empowered to make assignments, request appropriate support, and expend funds to complete this project. They are responsible for periodic updates to the line managers. Decisions concerning team functioning, process and analysis format will be made by the team leaders.

The team will assure that appropriate review is accomplished with those interagency teams/staffs required by FEMAT or other associated guidelines.

Core team members will have the basic responsibility as the primary ID team on this project. BLM and USFS Core team members will have lead roles in writing the document for specified resources. The EPA, USFWS and NMFS representatives will primarily have coordination roles, but will provide appropriate information to the Lead writers as needed. Core team members are empowered to work directly with and seek the assistance of support specialists assigned to the Nestucca basin project as needed.

Team members are empowered to transfer appropriate GIS records between systems in accordance with data sharing agreements to facilitate the analysis, and to seek GIS records from other agencies that may be necessary for the project.

Data and maps available to the public must be clearly labeled with relevant assumptions and data accuracy.

SCOPE: The Nestucca Basin watershed analysis will evaluate all areas tributary to the mainstem of the Nestucca River upstream from Nestucca Bay. It will analyze all lands within the basin, without regard to ownership.

GENERAL OBJECTIVES:

1. As a tool used to implement FEMAT and the RMP/LMPs, the document will serve as the line managers' implementation strategy.
2. Identify the current condition of resources
3. Identify the desired future condition of the Nestucca River Basin.
4. Identify the key processes and activities that need modification to achieve the desired conditions.
5. Recommend opportunities for restoration activities which address the issues/problems - what and where these opportunities are.
6. Identify the first five years of potential projects
7. Develop a systematic process of scheduling and implementing future projects and land treatments
8. Identify appropriate monitoring criteria and develop a systematic process of scheduling and implementing monitoring.
9. General objectives from FEMAT and the agency land use plans will apply.
10. Proceed under the assumption that Option 9 will be selected, but be adaptive to changing guidance and understand that if the final decision varies from Option 9, the analysis would have to be adjusted.
11. Keep the document clear, concise and readable to the public.
12. Across the landscape, feature a variety of habitats which will provide for and maintain the viability of all species.
13. Develop a process to determine Riparian Management Area widths.
14. Identify data "gaps" which need to be filled for future analysis.

PUBLIC PARTICIPATION: Involve the public in accordance with an approved Public Participation Plan, to be developed at the onset of the project.

APPENDIX I

The Human Dimension in Watershed Analysis

(Selected References, Social Assessment,
Historical Ecology, Public Involvement Newsletters)

APPENDIX I

THE HUMAN DIMENSION IN WATERSHED ANALYSIS

Historical Ecology

This involves analyzing the interplay of natural processes and human actions which have contributed to the current landscape. This analysis is essential to assessing the **current conditions** of a watershed. It also helps identify the **range of possible conditions** for a given landscape and the actions necessary to promote those conditions, by defining what has existed in the past. Such analyses may also contribute to the discussion of **ecosystem health** by identifying those practices which supported both healthy biological and healthy human communities.

There are two domains to this analysis: 1) Indigenous (Native American) land use patterns, and 2) Euro-American land use practices. Information contributing to these domains comes from numerous sources; other elements of watershed analysis (such as fire history, vegetation history) will contribute to these domains.

Historical descriptions may be addressed at any scale and at any level of detail, depending upon the information and time available. Like other aspects of watershed analysis, our understanding of the historical ecology of a region will evolve over time. The attached references and examples provide a starting place for watershed analysis teams.

Public Involvement

Public involvement is essential to the watershed analysis process in order to define **future desired conditions** and the actions appropriate to achieving those conditions. The essence of public involvement in this process is **dialogue**. This dialogue consists of two-way communication between those inside and outside the land management agencies. It is essential that agencies make clear the scientific understandings which guide policy decisions, as well as the limits (legal and practical) within which decisions are made. It is equally important that agencies seek and incorporate into the decision-making process both the substantive (e.g., natural resource specific) and qualitative (perceptions and values) information which the public offers.

Professionals trained in the social sciences, especially cultural anthropology and sociology, can assist greatly with this aspect of the human dimension. Such assistance can range from short training courses in interviewing and public meeting techniques, to full-time employment on social assessment and public participation issues. For more information, contact Kate Winthrop, District Archaeologist in the Medford District (503-770-2321).

Public involvement may be initiated as part of watershed analysis in the following steps:

Social Assessment (see description in Appendix I): This initial phase consists of assessing the situation for a given watershed (whatever the geographic scale). It involves defining the different constituencies (national, regional, local) and the major issues likely to arise. This assessment may be intensive and detailed, or fairly cursory, depending upon the specific landscape involved and the time available. Examples of intensive social assessments include the work accomplished by a cultural anthropologist for the Applegate Partnership in the Applegate Adaptive Management Area and ongoing studies in Lane County by an interdisciplinary team of researchers (see Appendix I).

Public Participation: The public participation process is essential for developing realistic policies to manage for **future desired conditions**. There are numerous ways to address the issue of public participation, including the development of partnerships and the appropriate use of techniques such as newsletters, field trips, television and radio spots and call-in programs, interviews, small meetings, etc. It is essential to coordinate within the district and among agencies to ensure our side of the dialogue is clear and consistent.

Project-related scoping and review: The work done for watershed analysis does not preclude the need for the standard NEPA process reviews, though it should greatly facilitate this review process.

Monitoring: Once the publics and issues in a landscape unit are identified and incorporated into the analysis process, it is necessary to monitor the situation through time, to keep the lines of communication open, useful, and effective.

Selected References: Historical Ecology

(Agency Archaeologists have considerable data and expertise to assist with this research.)
Articles marked with an asterisk (*) are included in Appendix I.

Blackburn, Thomas C. and Kat Anderson, editors

Before the Wilderness: Environmental Management by Native Californians. Menlo Park, CA: Ballena Press, 1993.

Many of the processes outlined in this collection of articles have relevance to the interior valley landscapes in western Oregon.

Boag, Peter C.

Environment and Experience. University of California Press, 1992.

This book describes the interaction of humans with the natural environment, including both Native American and historic Euro-American effects, for the Willamette Valley in general and the Calapooia watershed in particular. Highly informative.

*Boyd, Robert

"Strategies of Indian Burning in the Willamette Valley." Canadian Journal of Anthropology, 5(1): 65-86, 1986.

This article discusses the pre-contact environment of the Willamette Valley and includes a survey of anthropogenic burning in western Oregon.

Crumley, Carole, editor

Historical Ecology: Cultural Knowledge and Changing Landscapes. Sante Fe, NM: School of American Research Press, 1994.

The contributors to this book argue that historical understanding is essential to the formulation of the research and management options which guide and promote a sustainable quality of life. They present examples of historical ecological studies from around the globe.

Josephy, Alvin M., Jr., editor

America in 1492: The World of the Indian Peoples Before the Arrival of Columbus. New York: Vintage Books, 1993.

A collection of articles regarding the peoples and their daily lives on this continent prior to the European invasion, from an Indian perspective.

*Leiberman, Kenneth

"The Native Environment: Contemporary Perspectives of Southwestern Oregon's Native Americans." In Living With the Land: The Indians of Southwest Oregon, edited by Nan Hannon and Rich Olmo. Southern Oregon Historical Society, Medford, 1990.

*Lewis, Henry

"Reconstructing Patterns of Indian Burning in Southwestern Oregon." In Living With the Land: The Indians of Southwest Oregon, edited by Nan Hannon and Rich Olmo. Southern Oregon Historical Society, Medford, 1990.

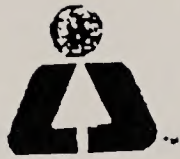
*Rogers-Martinez, Dennis

"The Sinkyone Intertribal Park Project." Restoration and Management Notes, 10(1): 64-69, 1992.

This article describes native land management practices in northern California coastal forests and has relevance to Oregon coastal environments.

Attachments: Public Involvement

There is a wealth of information on policies, tools, techniques, and examples regarding this element of the human dimension. There are no easy "how-to" guides; using a professional to help sort through all the options is a possibility. Listed in Appendix I are: 1) a definition of social assessment; 2) notes on the Applegate Partnership social assessment process; 3) a brief summary of work in Lane County incorporating social science techniques in support of policy analyses.



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7/93

SOCIAL ASSESSMENT DESCRIPTION

Years of agency "public involvement" processes have demonstrated that mailings, public meetings, and other top down outreach processes are only marginally successful at either informing or including the public in agency activities. A critical element in the overall success of an ecosystem-based management system is developing new ways to involve the community and outside stakeholders directly in the formulation and implementation of both the ecosystem management plan, and the related community redevelopment program.

The core goal of a community assessment is directly analogous to an ecological assessment: you must understand the current condition of a social system before you can assist in identifying and working toward a desired future condition. The purpose of this community assessment is to determine how an existing, in-place culture actually functions, to identify the informal methods of problem-solving people use in their routine experience, and to clarify how decisions are arrived at and implemented in the community. Once the cultural mechanisms are identified, then specific communication links into that culture can be established so that the community can efficiently process "new ways of doing things" with minimum confusion and disruption. This culturally sensitive approach maximizes the likelihood that the land managers and the community can work together productively in developing a more ecologically sustainable management approach.

Community networks, public issues and community resources are identified by way of interviews and observation. Interviews are conducted with key contacts from whom names of additional interested residents are identified. In this way, gathering places are identified and frequented--grocery stores, laundromats, cafes, etc. Often, gathering places are used differently and at different times by various networks. Contacts made at gathering places are used to network to other people. In a short period of time, all geographic areas, all publics, and all issues are identified.

Networks and issues are then mapped according to geographic region and integrated within the ecosystem management framework. Monitoring, and the ongoing flow of information between the Partnership, agencies and the local community is established through the caretakers of each network. As issues get resolved, and others identified, this information is transmitted throughout the community, greatly enhancing public support for Partnership and agency efforts. Gradually the community will gain increasing ownership and responsibility for participation in all phases of project identification, implementation, and monitoring.

The social assessment is also the first phase in a larger economic development strategy which builds on the contacts and inventory of resources developed in the assessment to assist the community in formulating a comprehensive economic redevelopment strategy based on the skills, interests, and capacities of the Applegate community.

A Socio-Ecological Approach to Policy and Land Use Analyses of Natural Resources in the Pacific Northwest

Final Report Northwest Area Foundation

Summary

This report describes a program and a method to examine forest land use alternatives in the Pacific Northwest. Our approach is to integrate disciplinary expertises, databases and public input to explore ecological and socio-economic issues of forestry in the region. Through the program, we link scientific disciplinary expertise with the concerns of citizens, interest groups, and agencies, primarily with collaborative, multi-stakeholder forums. The method combines ecological databases and social inventories in a geographic information system (GIS) that allows both reconstruction and projection of forest land use patterns. Understanding land use is central to our approach because land use is how social and ecological forces merge on the landscape and are the expression of policy. Thus, this report describes our continuing effort to develop both program and method because it is through examination of the linkages and interactions of social, ecological, and economic factors that the processes underlying forest policy will be understood and possible intervention points identified. It is also essential to involve local policy makers and citizens since it is through their activities that policy alternatives are identified and enacted.

Background

Over the last three years, natural scientists, social scientists and humanists at Oregon State University have created a program to better understand ecological and social processes that influence forestry in the Pacific Northwest. At the time of this grant, several independent research projects were underway that used ecosystem modelling, remote sensing imagery, and social inventories to link land uses with ecosystem behavior in forests (Cohen and Spies 1992) and agriculture (Roush et al. 1992). Other projects explored linkages among socio-economics, politics and land use pattern (Johnson 1991). The goal of this project (grant) is to more firmly establish linkages among these independent research projects and with citizens, interest groups and agencies so that the consequences of policy alternatives on forest land uses and socio-economic well-being of human communities in the region can be determined.

Geographic Area

The project focused on a specific geographic area, eastern Lane County. We chose this area for several reasons: (1) it is representative of the western portion of the Pacific Northwest eco-region, both ecologically and socially, (2) land use

controversies are well developed in the area with many interests groups proposing alternative and often conflicting solutions, (3) our understanding of ecological phenomena in the area is well advanced because of nearly four decades of intensive research by ecologists and physical scientists, some within our group, (4) there is considerable socio-economic data available for the area, and (5) citizens, interest groups, and agency representatives are willing to work with us to accomplish and expand the project.

General Approach

We found land use to be a central variable linking social and ecological concerns of people living in the study area. Economic, political, and ecological forces continually modify the way humans use land, while changes in land use, in turn, affect both local- and global-scale ecological phenomena, such as ecosystem sustainability, biodiversity, and CO₂ flux to the atmosphere. In this project, we identified, following an approach suggested by the Consortium for International Earth Science Information Network (CIESEN 1992), five specific social and ecological factors (figure 1) from which to construct our methodology for eastern Lane County.

Figure 1

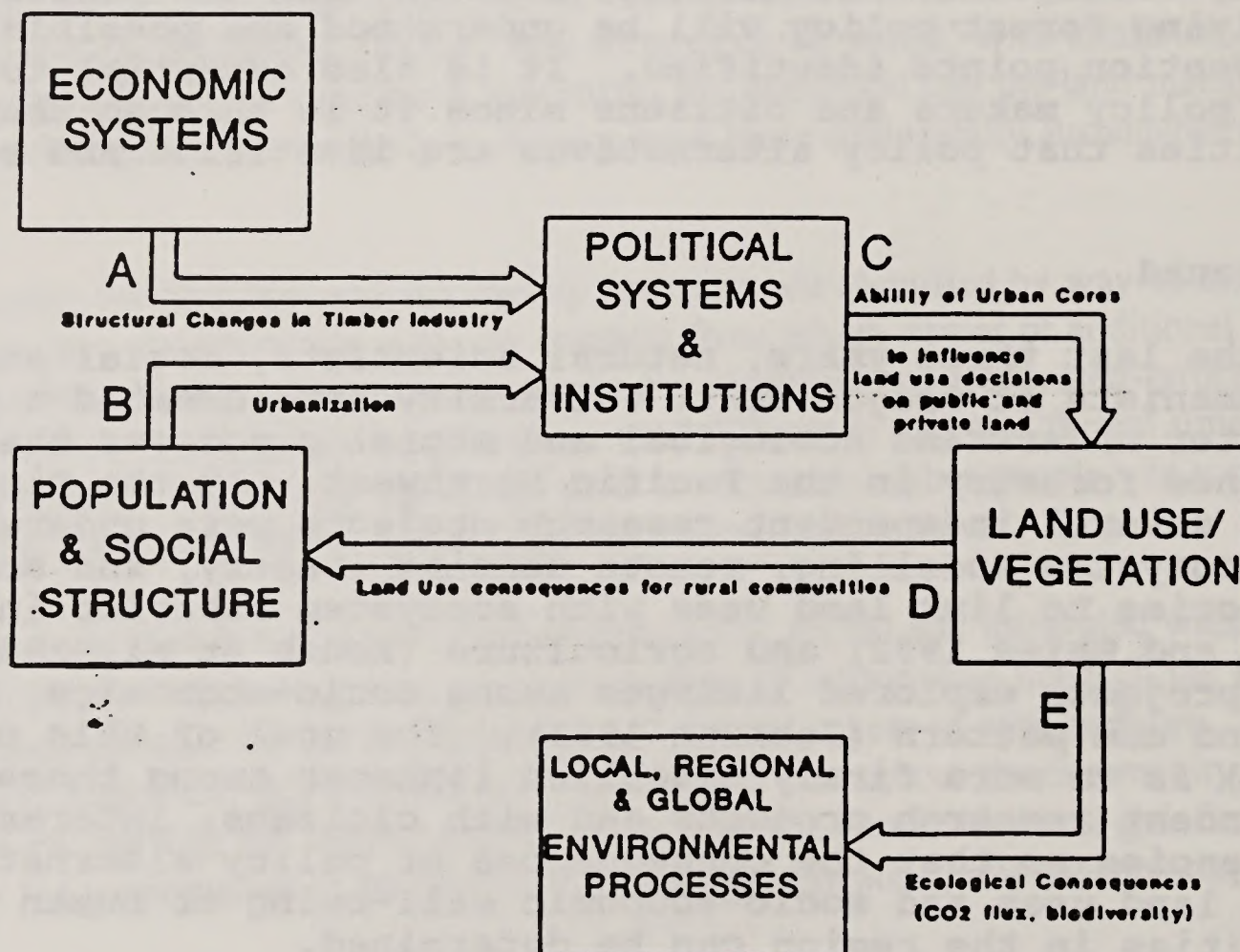


Figure 1. Relationship among five social and ecological factors that influence forests and human communities in the study area.

Thus, we have begun to compile datasets to examine and link the following factors: (A) structural changes in the timber industry, (B) urbanization in the western Oregon region (e.g. Eugene, Corvallis, Salem, Portland), (C) the relative power exerted by urban cores and rural resource-based communities over land use decisions on public and private land, (D) subsequent land use consequences for rural communities, and (E) local ecological consequences of specific land uses. Global ecological consequences of land uses are being studied through a supporting research project.

Specific activities of this project are discussed below. They include: (1) involvement with existing collaborative forums composed of citizens, interest groups, and agencies to identify issues and policy alternatives, (2) dataset acquisition, database management, and GIS, (3) examination of effects of ownership and land use patterns on vegetation and ecological and social well-being, (4) case studies and surveys of attitudes about and consequences of land use policies in eastern Lane County, (5) development of a multi-scale, multi-jurisdictional management model in association with the University of Oregon, Bureau of Land Management, and U.S. Forest Service.

Activities/Accomplishments

Involvement with existing collaborative forums. There is a great need in the Pacific Northwest for a procedure to resolve conflict about forest land use that is perceived as fair, and capable of linking citizens, as well as interests groups, to policy. Collaborative forums are increasingly being used to supplement existing policy avenues as interests seek common ground and consensus concerning future direction of natural resource management. Organizations, agencies and people that we have contacted and are participating with us in various portions of this project are presented in Table 1.

Dataset acquisition, database management, and GIS. Up-to-date scientific information about the social and economic impacts of human activities are critical for sound forest policy and management decisions. This project draws upon existing geo-physical, ecological, social and economic data from OSU and other Northwest research institutions. Thus, our efforts have been primarily on the identification and organization of data rather than on the collection of it. The database management of this project also is tied strongly to development of GIS maps and "overlays" of the study area. All data are available to all participants in the project. The types of datasets currently being used by the project are briefly described below.

Base map. A basemap of the eastern Lane County has been created (scale 1:62,500) that indicates topography, hydrology (rivers and creeks) urban boundaries, and transportation networks (figure 2).

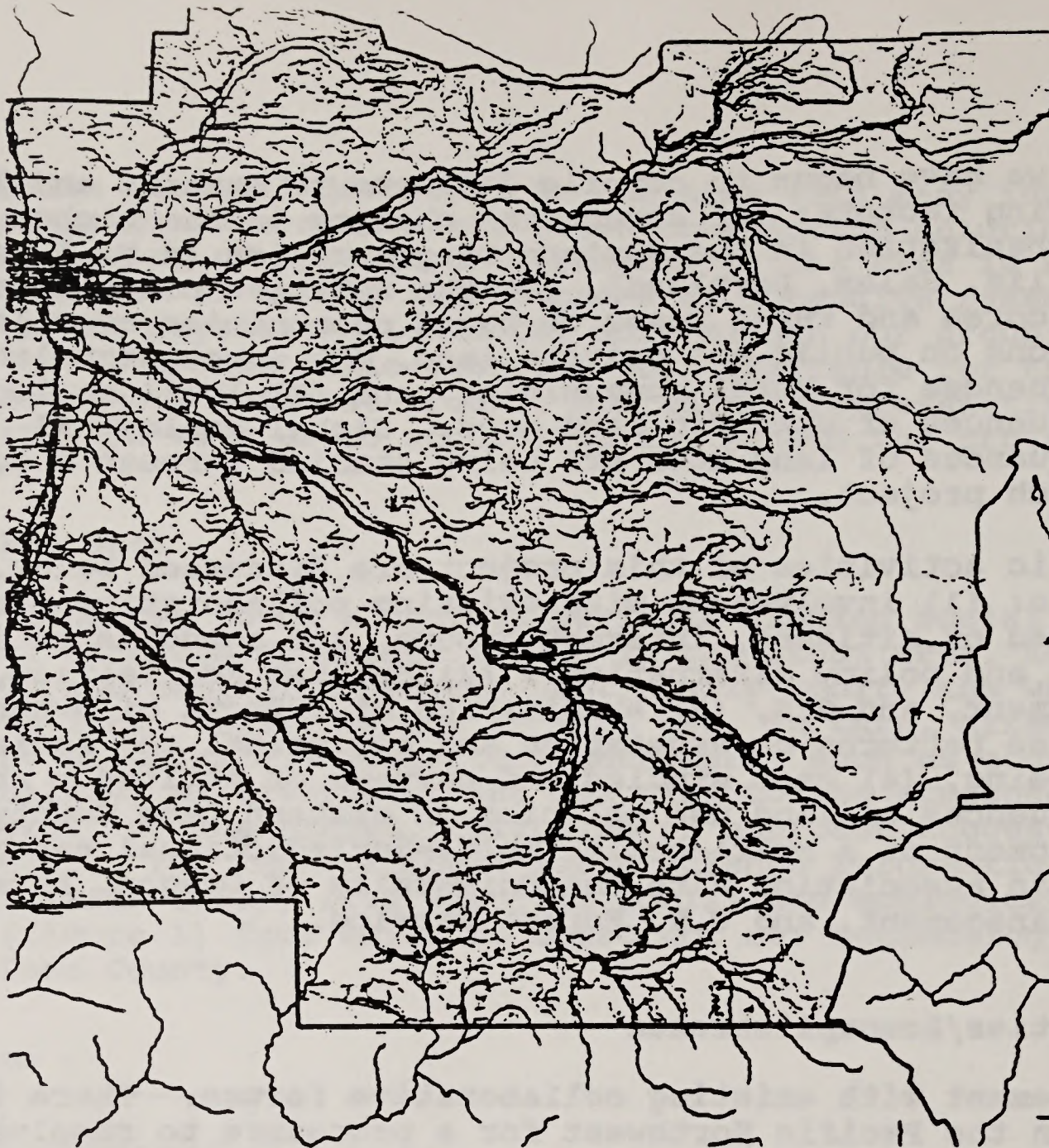


Figure 2. Base map of eastern Lane County. Roads (orange), rivers, streams and reservoirs (blue), and the communities of Eugene, Cottage Grove, and Oakridge are shown.

This basemap is the foundation on which all other ecological, social, and economic information is presented. The various datasets of the project are described in "dictionary" form, i.e., the data is listed, its format described, and procedures for adding data to the database are explained. Any changes in the data's organization also are identified. As the data dictionary is continually being expanded and improved, the investigators also identify sources of new data and to what degree the data will need to be converted, amended, or modified to fit the needs of the project.

Land use and vegetation. Land use in eastern Lane County comprises a continuum from largely undisturbed wilderness, to various levels of human disturbance for timber, agriculture, and settlement. Patterns of land use on the forested areas of Lane County and all of western Oregon and Washington are being reconstructed from Landsat Thematic Mapper (TM) and Multispectral Scanner (MSS) imagery. These data are input as image files directly into our GIS ARCINFO database.

Ownership. An existing 1:100,000 scale general ownership map has been acquired. The map distinguishes among federal, state, and private lands of Oregon and Washington, but does not distinguish among large and small private owners. We are now augmenting this dataset with more detailed information on private ownership boundaries from the Lane County Organization of Governments (LCOG) and information from the Lane County tax assessors office.

Population and demography. TIGER files, containing information from the U.S. Census, are being integrated into the GIS database. These files contain diverse demographic and socio-economic information within census tract and block boundaries.

Patterns of land ownership, land use, vegetation and ecological and social well-being. Land ownership patterns provide an important link between the social and ecological aspects of the project. Ownership is a major factor influencing land use, and thus vegetation pattern (figure 3).

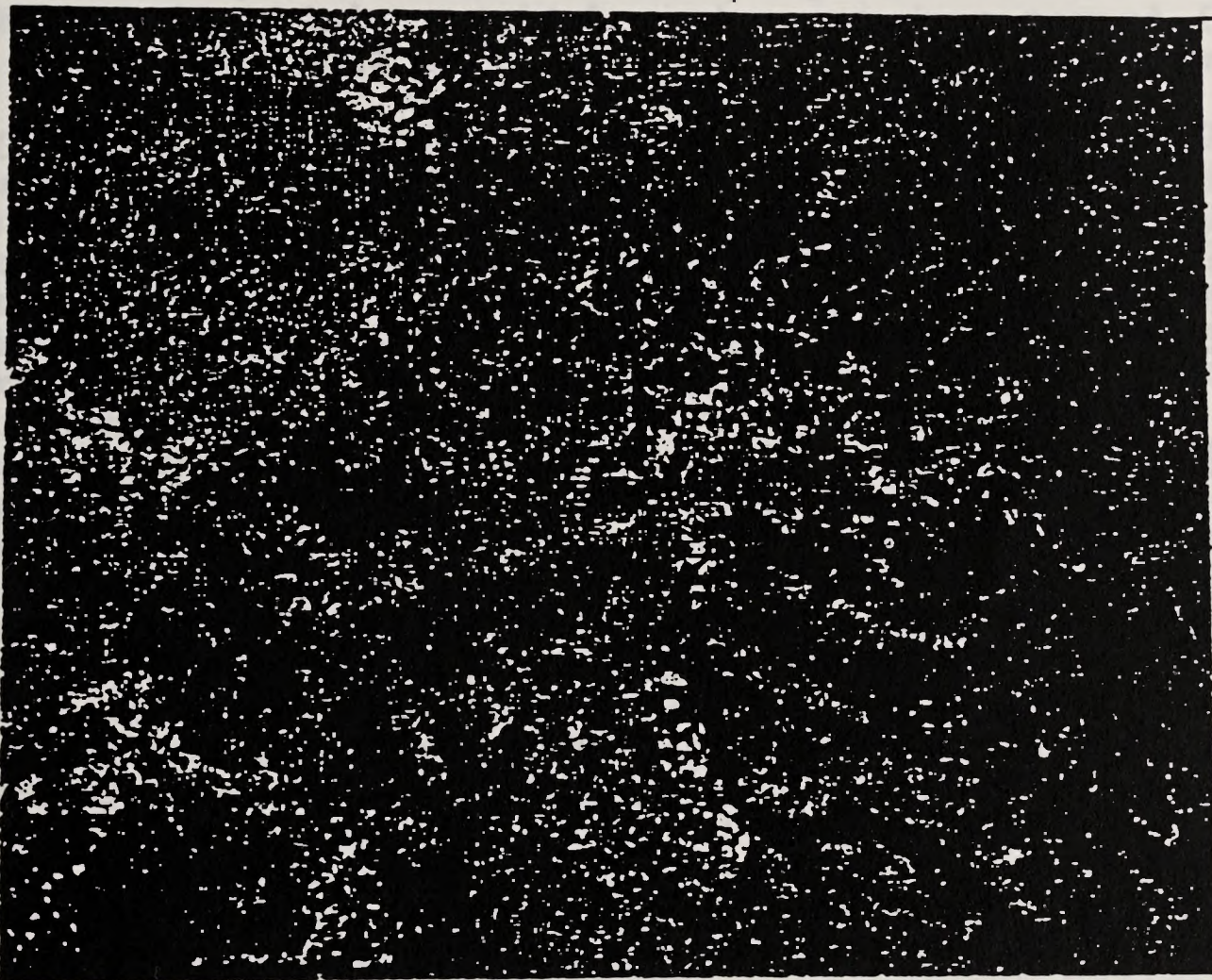


Figure 3. Distribution of vegetation according to ownership type. Vegetation was reconstructed from MSS images using the Earth Resources Data Analysis System (ERDAS). Water (blue), soil/rock (brown), hardwood/conifer mix of 2-20 years (light brown), hardwood conifer mix >20 years (red), closed canopy conifer of 20-80 years (yellow), closed conifer of 120-200 years (green), conifers >200 years (dark green). Ownership boundaries are depicted by narrow black lines.

For example, we have found that almost 1 percent of the public land in our study area was cut annually between 1972 and 1988, whereas 2.15 percent was cut per year on private lands (Spies et al. 1993, in review). These cutting rates imply timber harvest rotation times of 105 years on public lands and only 47 years on private lands. Current mensuration models of timber yield suggest that rotation times for optimum timber productivity should be approximately 1.5 to 3 times longer for public and private lands, respectively. Clearly, ownership has greatly affected land use with large potential ecological and social consequences.

We are now interfacing these datasets with those for human population and demography to explore the relationship of these cutting rates and rotation lengths on such factors as population change, employment, and per capita income. Ecosystem models for carbon budgeting, forest regeneration and species habitat (e.g. forest structure and fractionation) are also being integrated with this dataset through the GIS to examine important local and regional issues such as sustained timber yield and species biodiversity (Wallin and Cohen, 1993, in progress).

Case studies and surveys of attitudes about and consequences of land use Underlying values, attitudes and interests of individuals, groups and policy makers determine what facts are deemed important. As part of the process of investigating forest policy making, we are compiling data about rural and urban value systems in eastern Lane County and surrounding areas concerning natural resources, in general, and local forests, in particular. Our inquiry takes two forms: (1) examination of policy case studies and (2) surveys to determine values, knowledge, and trust concerning forest policy issues. To better define the power that the urban-core industry and interest groups exert on the rural periphery, we have chosen two case studies of eastern Lane County: the evolution of the Willamette National Forest Plan from 1976 to 1990 and the Oakridge Sustainable Yield Unit. We also survey people in the study area about how forest lands are used, their ecological knowledge about forests, and their trust in the forest planning process.

Case 1: Willamette National Forest Plan. In the 1990 update of the Forest Plan, timber harvests were at some of the highest levels in the history of the Forest. The preferred Forest Service alternative reduced harvests, but the alternative finally adopted reduced harvest levels even more and increased the amount of land allocated to habitat conservation areas and old growth. To determine the relative influence of the urban core on the rural periphery, we are analyzing content from the comments of over 200 business and interest groups during development of the 1990 Plan. The analysis focuses on plan preferences, types of arguments made, and kinds of information used to support the arguments (Smith et al., 1993, in preparation). The results of this content analysis are now being merged with data already gathered about the resources

(money, staff, time) and values of groups in the urban-industrial core and rural periphery.

Case 2: Oakridge Sustainable Yield Unit. Beginning in 1923, the U.S. Forest Service promoted the development of Westfir and Oakridge as sustained-yield units with the objective of ensuring a continuous supply of timber for "a stable community to be established which provides decent living conditions and encourages family life" (Jensen 1970). Changes in demography and social structure of Oakridge from the early 1900's to the present is being studied using historical and ethnographic methods. Local Forest Service, county and census records are being used to document the pattern of forest land use around Oakridge. Local interviews are also being conducted with residents and those outside the community that have knowledge of Oakridge's history. Census reports from the TIGER geographic database are being used in this analysis and will subsequently be merged with our analysis of land ownership and vegetation pattern to complete the analysis.

Surveys of values, knowledge and trust. We are investigating the value systems of rural and urban publics, forest interest groups (industrial environmental, and recreational organizations) and agency personnel in eastern Lane County using a combination of survey research and interview techniques. This approach refines and adds to the database established by Steel and his associates (1993a,b, and in review). Their studies find strong biocentric value orientations toward forests among both Oregon and national publics and further suggested that value orientations of citizens strongly influence policy preferences for federal lands.

Multi-scale, multi-jurisdictional land management model. A collaborative effort between federal land managers, county and municipal planners, and scientists at the Universities of Oregon and OSU is underway to model the cumulative ecological, economic, and social implications of implementing current forest management plans within Lane County. The system is organized around a computer geographic information system, using MacIntosh GIS, which is linked to a set of mathematical models describing the socio-economic and ecological processes. Such a decision support tool, ~~when~~ provided in a collaborative consensus building context, should permit inter-jurisdictional options to be explored that optimize ecological and social or economic consequences of current and proposed forest policy.

Future Progress

There has been considerable collective effort by the participants in this project (various citizens and interest groups in the mid-Willamette region, scientist at OSU and UO) to develop the program and methodology discussed in this report. We believe we

have identified an approach that satisfies a wide array of the information needs that are a consequence of the current "forest debate" in the region. It is a three-tiered approach that involves existing collaborative forums, information collection and synthesis, and development of a GIS decision support tool. Because of this grant and support from collaborating projects, substantial advancements have been achieved. Data collection and synthesis continues to be supported internally through USFS-PNW Research Station and the OSU College of Forestry - Sustainable Forestry Program, and external sources such as NASA, NSF, and US-MAB programs. The construction of the decision support tool is being supported locally by the Willamette NF and Eugene District of the BLM until new Congressional appropriations are made. Thus, it is our intention to ask NWAFF, and perhaps other foundations, to support the continued linkage of the Program into collaborative forums of local people and interest groups.

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Table 1. Participants in the project: A socio-ecological approach to policy and land use analyses of natural resources in the Pacific Northwest.

Scientists

Steven Radosevich, Forest Science; OSU (Co-leader, ecology)
Phillip Sollins, Forest Science, LTER; (Co-leader, ecology)
Patricia Scruggs, Forest Science; OSU (Co-leader, sustainable development, policy)

Warren Cohen, USFS; LTER (remote sensing, ecology)
Sheila Cordray, Sociology; OSU (sociology)
Steven Daniels, Forest Resources; OSU (policy, economics)
Richard Gale, Sociology; UO (sociology, policy)
Kathy Goetz, Family Resources; OSU (sociology)
David Hulse, Sustainable Development Program; UO
Peter List, Philosophy; OSU (ethics, policy)
James Pease, Geography; OSU (land use, GIS)
David Perry, Forest Science; OSU (ecology biodiversity)
David Povey, Sustainable Development Program; UO
Mary Lynn Roush, Forest Science; OSU (ecology, land use)
Courtland Smith, Anthropology; OSU (cultural anthropology, policy)
Brent Steel, Political Science; WSU-Vancouver (policy)

Interest Group (Stakeholder) Contacts:

Richard Baldwin, President, Santiam Forest Products Company
Linn Burditt, District Ranger, McKenzie River; Willamette National Forest
Darrel Kenops, Forest Supervisor, Willamette National Forest
Ronald Kaufman, District Supervisor, Bureau of Land Management
Roy Keene, Public Forest Foundation
Craig Patterson, McKenzie River Cooperative
Chuck Willers, Coast Range Association
Zane Smith, American Forests
Kathy Weiderhall, Lane County Council of Governments
Lori Power, Eugene Water & Electric Board

Supporting Organizations:

Cascade Center; USFS, OSU
Center for Analysis of Environmental Change; OSU
College of Forestry; OSU
Man and Biosphere Program; State Department, Washington, D.C.
Northwest Area Foundation

WORKING GROUP ACTIVITIES - SPRING 1993
MAB TASKS

TASK #	DESCRIPTION	RESEARCHERS	DATA NEEDED	RELATED TO	PROGRESS
Task 1	Map physical setting (geomorphology, soils, climate, elevation, DEM DLG, rivers) and enter into GIS	Roush, Sollins, Cohen			
Task 2a	Physical aspects of social network: Transport routes and patterns of settlement. Use historical records, such as census and tax rolls, to document ownership patterns.	Smith, Goetz	History of settlement in Oakridge		Have maps of current transport routes and communities; history of entire area may not be possible with our resources
Task 2b	Coarse scale ownership maps with particular attention to public/private (1972-1988)	Roush		Task 1	
Task 2c	Determine economic (resource dependence) and duration of farms and settlements in area. Trace impacts of social, economic, and political factors on vegetation.	Cordray, Gale?	Map of mills (paper, plywood, lumber); History of mills; Map showing size of related communities over time; Ownership and vegetation maps (particularly in agricultural areas); Maps showing effects of major legislation policy and land use decisions affecting region (LCDC, forest plans, spotted owl, etc.)	Tasks 1, 2b, 3	
			Maps showing changes in these areas over time		

TASK #	DESCRIPTION	RESEARCHERS	DATA	D	RELATED TO	PROGRESS
Task 3	Map current and recent past land-use management patterns (vegetation) from satellite imagery & aerial photos (1970-1990)	Cohen, Sollins, Radosevich			Tasks 2a & 2b	
Task 4	Map patterns of forest cutting, fire, and cropping over last century and relate to Tasks 1, 2, & 3.	????? Is anyone really working on this? Can we do it w/out more resources & Jones?			Tasks 1, 2, & 3	Some already done for USFS land on Lookout Creek, Blue River, North Fork of Middle Fork Willamette
Task 5	Calculate C stores in vegetation and soil for each major land ownership pattern within each basin in 1972 and 1988. From change in C stores between these two dates, calculate the CO ₂ release to the atmosphere by land use and wonership type.	Sollins, Cohen, Radosevich, Harmon (?), Turner (?)			Tasks 2b, 3, NASA project	
Task 6	Use survey research and interviews to document attitudes, policy orientations toward resource use in the study area (i.e. ideologies, world views), and the influences of social networks on land use decisions.	List, Steel				
Task 6a	Mail questionnaires to random samples of the public and to relevant natural resource interest groups	List, Steel				Completed. Status of analysis?
Task 6b	Interview and survey relevant policy makers and agency personnel to determine how the belief systems indentified in 6a are transmitted into the political and social structure of the region.	List, Steel				

TASK #	DESCRIPTION	RESEARCHERS	DATA NEEDED	RELATED TO	PROGRESS
Task 6c	Analyze how interest groups mobilize resources, including technical expertise and information, to influence land-use decisions in the region.	List, Steel Smith???			Work in progress on Willamette Forest plan?
Task 7	Determine effects of core/periphery relations on land-use decision making. This will be done by contrasting wilderness and other special land-use designations between the two drainages and examining the role of external economic and political influences.	Smith, Cordray, List, Steel	Records and hearings for flood control projects and the Willamette Basin Comprehensive Study of Water and related Land Resources provide a means for assessing these influences. HAS THIS BEEN DROPPED IN FAVOR OF THE WILLAMETTE FOREST PLAN???	CAEC Task 2c (for more details)	
Task 8a	Determine feedbacks from ecosystem patterns and land-use patterns to physical setting, settlement, ownership, and land-use decisions (e.g. effects of dam construction, landslides, etc.) social networks, urban cores, and land-use decisions.	Entire group			
Task 8b	Evaluate how information about ecosystem attributes has influenced land-use decisions.	List, Steel, Smith???			

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Table 3	Help current and recent past land use management practices (especially from various January 1 land plans (1970-1990))	Cham, Bolivia, Plurinational		Table 2: 2.20	
Table 4	List authors of forest census, 1990, and working area that census and status in Table 1, 2, 3	77777 in region study working on that time on the subject area		Table 1, 2, 3, 4	Index already done by 1995 land use land cover, then from that time of forest land (1990-1995)
Table 5	List authors of forest census, 1990, and working area that census and status in Table 1, 2, 3	77777 in region study working on that time on the subject area		Table 1, 2, 3, 4	
Table 6	List authors of forest census, 1990, and working area that census and status in Table 1, 2, 3	77777 in region study working on that time on the subject area			
Table 7	List authors of forest census, 1990, and working area that census and status in Table 1, 2, 3	77777 in region study working on that time on the subject area			
Table 8	List authors of forest census, 1990, and working area that census and status in Table 1, 2, 3	77777 in region study working on that time on the subject area			
Table 9	List authors of forest census, 1990, and working area that census and status in Table 1, 2, 3	77777 in region study working on that time on the subject area			Index already done by 1995 land use land cover, then from that time of forest land (1990-1995)

STRATEGIES OF INDIAN BURNING IN THE WILLAMETTE VALLEY¹

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Abstract: This paper is a detailed reconstruction of a single technique of environmental manipulation, the annual burning of large tracts of vegetation, as practiced by the indigenous hunting and gathering people of the Willamette Valley, the Kalapuyan Indians. The paper is divided into three parts. The first introduces the problem of aboriginal burning practices and provides a quick geographical and ethnographic survey of the pre-white Willamette Valley; the second presents the ethnohistorical evidence for local aboriginal burning; and the last attempts to place burning practices in the context of the Kalapuyan subsistence strategy. The paper concludes with a brief survey of anthropogenic burning in a regional perspective.

Résumé: Dans cette communication je présent la reconstruction détaillée d'une technologie de manipulation de l'environnement, qui est le brûlage annuel d'une grande étendue de végétation. Dans ce cas il s'agit du brûlage pratiqué par un peuple, les Kalapuyas de la vallée de la Willamette, qui était à l'époque de l'arrivée des colons européens, des chasseurs-cueilleurs. La communication est divisée en trois parties. La première introduit le problème du brûlage que pratiquaient les aborigènes et fournit un compte rendu de la géographie et de l'ethnographie de la vallée de la Willamette. La seconde partie décrit les données ethnohistoriques qui démontrent l'usage de cette technique de manipulation du milieu par les indiens de la vallée, et la dernière partie a comme but de placer le brûlage dans le contexte des stratégies de subsistance des Kalapuyas. La communication se termine avec un sommaire du phénomène du brûlage situé dans une perspective régionale.

Keywords: Kalapuyan Indians, Willamette Valley, Aboriginal burning practices, Anthropogenic fire, Subsistence round.

INTRODUCTION

Previous Research

In 1971 geographer Carl Johannessen and colleagues at the University of Oregon published an article, *The Vegetation of the Willamette Valley* (Johannessen *et al*) which proposed that, prior to European contact, the Willamette Valley, though surrounded by dense forest of Douglas fir, was an open oak-savannah grassland. They also presented historical evidence to show that these prairie grasslands were maintained by annual fires set by the aboriginal inhabitants of the valley, the Kalapuya Indians. In 1979, geographer Jerry Towle, citing Johannessen *et al*'s evidence, suggested that archaeologists and cultural anthropologists should incorporate the heretofore neglected historical information on anthropogenic burning and its consequences for Indian subsistence in the Willamette Valley. Building upon what has been established by previous researchers, the present paper attempts to reconstruct the role of man-made fires in the hunting-gathering practices of Kalapuya Indians.

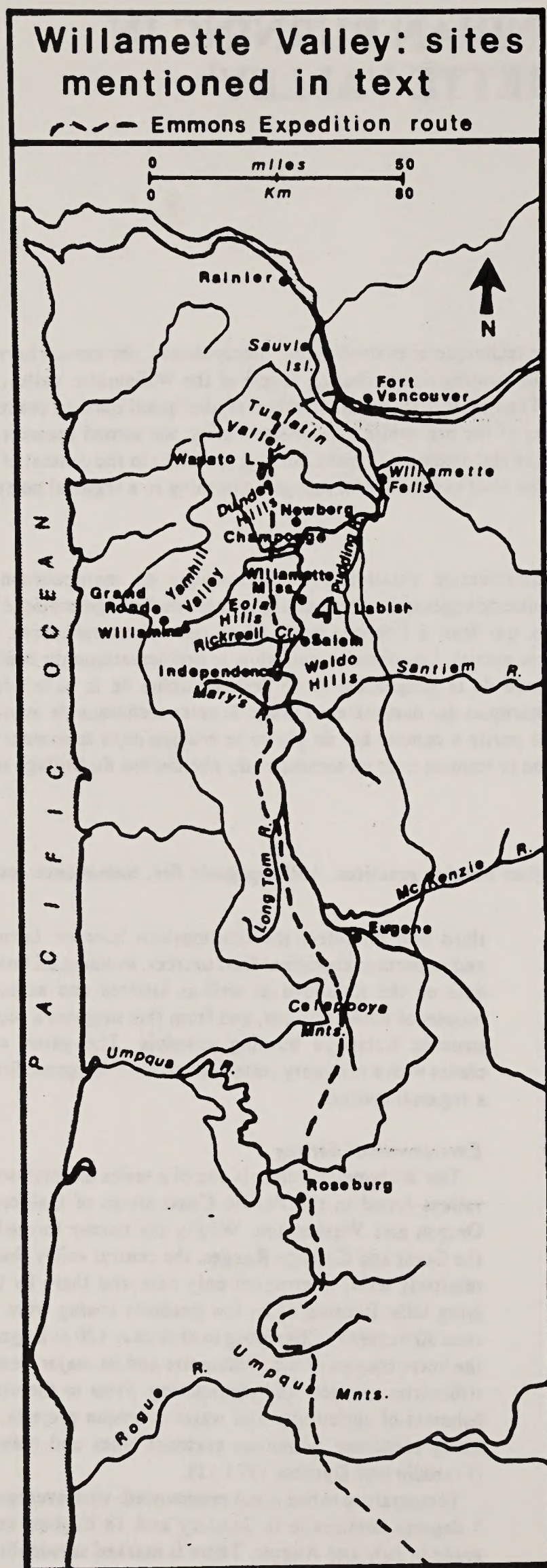
This paper is organized in three parts: the first is an overview of pre-contact environment and Kalapuya culture; the second presents extant historical data (1826-1847) on Indian-caused fires in the Willamette Valley (completing the documentary task begun by William Morris (1936) and Johannessen *et al* (1971); and the

third part considers the relationships between burning and important aboriginal food sources, utilizing all known data on the Kalapuya as well as kindred and adjacent peoples of native Oregon, and from this suggests a reconstructed Kalapuya burning schedule. The paper concludes with a summary statement on anthropogenic fire in a regional context.

Environmental Setting

The Willamette Valley is one of a series of north-south valleys found in the Pacific Coast states of California, Oregon and Washington. Within the border formed by the Coast and Cascade Ranges, the central valley floor is relatively level, interrupted only here and there by low-lying hills. Because of its low gradient (rising from less than 30 meters at Champoege to little over 120 at Eugene), the lower courses of the Willamette and its major western tributaries are slow and meandering. Prior to the establishment of agriculture and water diversion projects, the valley contained numerous seasonal lakes and marshes (Franklin and Dyrness 1973:12).

Temperature range is not pronounced, with averages of 3 degrees centigrade in January and 18 degrees centigrade in July and August. There is marked seasonality in rainfall with more than three-fourths of the average annual precipitation of 965mm during the six months between October and March. July and August are the driest



months with an average of only 15 mm (NOAA 1978:814). Lightning storms are rare over most of Western Oregon, occurring in significant numbers only in the higher elevations of the Cascade Range (Morris 1934). As in California, natural fires are associated with summer storms, which influence interior coniferous forests far more than coastal or valley environments.

Many researchers have attempted to reconstruct the pre-contact plant cover of the Willamette Valley. The most successful of these (Habeck 1961; Johannessen *et al* 1971) have used detailed land survey records dating from the early 1850s, in association with early historical accounts of valley explorers and pioneers. These documents indicate that at the time of first settlement, most of the valley was open grassland with scattered concentrations of oaks in hilly areas, an environment which might be best termed as an "oak savannah" (Habeck 1961:61). Similar biotypes, differing only in higher frequencies of xeric plants, were found in other interior valleys to the south and in California.

On closer examination, it is apparent that the Willamette Valley was subdivided into a number of micro-environments, each with its characteristic vegetation. The exact composition of some of these plant communities is difficult to reconstruct because of widespread disturbances associated with the introduction of agriculture and the rapid invasion of numerous exotics after the mid 1800s. The grasslands themselves were one of the most severely altered communities (Nelson 1919:226). Recent research suggests that three perennial grasses – *Festuca rubra*, *Danthonia californica*, and *Stipa occidentalis* – were dominant locally, their occurrence depending upon availability of water (Franklin and Dyrness 1973:122). Oaks (*Quercus garryana*) were originally found dispersed over the savannah in concentrations free of underbrush (called "oak openings" by the surveyors). In the nearly 140 years since the cessation of regular burning, surviving openings have grown into closed oak forests with understories dominated by hazel (*Corylus cornuta*), poison oak (*Rhus diversiloba*), and serviceberry (*Amelanchier alnifolia*) (Thilenius 1968).

A second microenvironment was especially important in the northern portion of the valley, where low elevations, high water tables, and seasonal flooding created marshy areas around low-lying lakes (such as the now drained Wapato Lake and Lake Labish), and in gullies containing feeders to the main rivers (known locally as "swales"). Dominant forms here were various species of *Glyceria*, *Juncus*, and bulbous plants such as camas (*Camassia quamash*), wapato (*Sagittaria latifolia*), and wild onion (*Allium spp.*), all favored foods of the aborigines.

Deciduous forests, composed chiefly of ash (*Fraxinus latifolia*) and alder (*Alnus rubra*) formed a third micro-environment in the narrow corridor along major waterways. The winter villages of the valley Indians were located in this zone. Finally, dense coniferous forests dominated by Douglas fir (*Pseudotsuga menziesii*) were found in the higher elevations of the surrounding Coast and Cascade Mountains. Although the coniferous forests were minimally exploited by the Kalapuya, the ever-shifting forest edges, with their diverse flora (such as salal

{*Gaultheria shallon*}, Oregon grape {*Berberis nervosa*}, and berries {*Rubus* and *Vaccinium spp.*}) were seasonally utilized by the Indians.

Some idea of the topography and vegetation of the pristine valley can be obtained from the following eyewitness accounts. The first, from explorer George Emmons' Journal of 1841 describes the prospect from what is probably the Eola Hills.

8/7/41 . . . the Yamhills . . . are a little singular being the only hills of any magnitude that rise from the great Walamat Valley - in an extent of Prairie from 60 to 100 miles either way. . . from the top of these at an alt. of about 1000 feet - had a grand panorama view. . . prairie to the south as far as the view extends - the streams being easily traced by a border of trees that grew up on either bank. . . white oak scattered about in all directions.

The second quotation, from Alva Shaw, a pioneer, in a letter dated 1844, gives a quick overview of the economically important native plants of the valley.

Productions Strawberries Rasp Berries Dew Berries Whortle berries service Berries and numerous other kinds so that fruit of that description is plenty from May until September the vallies abound in different kinds of edible roots, the most common of which is La Camas. . . resembles onions in shape and looks but has a sweetish taste and grows abundantly so much so that I am told that . . . when it is in bloom in many places hides almost every other sign of vegetation. the Wappatoo grows in swampland and resembles potatoes these two roots with the acorns that grow on the low scrubby White oaks which far surpass any thing of the kind that I have ever seen and form a range for hogs the best that could possibly be . . . grass of an excellent quality abounds on the high hills and in the vallies. . . the grass commences growing when the rains begin in the fall and continues to grow through the fall Winter and spring and dies with the dry weather in summer.

More detailed descriptions of the original topography and plant cover of the valley may be found in Work (1923), Wilkes (1849), Palmer (1847), and Shaw (1848). An excellent description of seasonal changes in vegetation by Clyman (1906) is cited later in this paper.

It is the consensus of contemporary researchers (Habeck 1961; Thilenius 1968; Johannessen *et al* 1971; Towle 1974) that the oak savannah of the Willamette Valley was a seral community, maintained by frequent firing. In the nearly 140 years since initial agricultural settlement, with fire removed as an important ecological factor, forest cover (both Douglas fir and Garry oak) has increased and now covers most areas not cultivated or grazed. Habeck (1962:16) hypothesizes that a continuation of the current fire control will result in replacement of Garry oak in most areas by mixed stands of Douglas fir and Big-leaved Maple (*Acer macrophyllum*), given the inability of the oak to reproduce in its own shade.

Palynological studies (Hansen 1942; Heusser 1960) indicate that the Willamette Valley has been dominated by oak savannah for over 6000 years. The *origin* of the valley biotype appears to date to the warmer and drier climate of the Hypsithermal period (8000-4000 B.P.) when natural conditions probably prevented the establishment of a closed canopy forest. Yet the Willamette Valley oak savannah has persisted throughout the millennia since its inception, despite the appearance of a modern climate amenable to forest growth, and contrary to the pattern of forest spread which has occurred during the last century.

Natural fires do not occur frequently enough to account for the continuation of the subclimax vegetation. Some other force must have been responsible. It was this kind of evidence and this line of reasoning that led both Habeck (1961) and Johannessen *et al* (1971) to consider the sizable historical literature on Indian burning in the Willamette Valley, and to hypothesize that regular aboriginal fires were the main cause of the perpetuation of the oak savannah².

Native Inhabitants of The Willamette Valley:

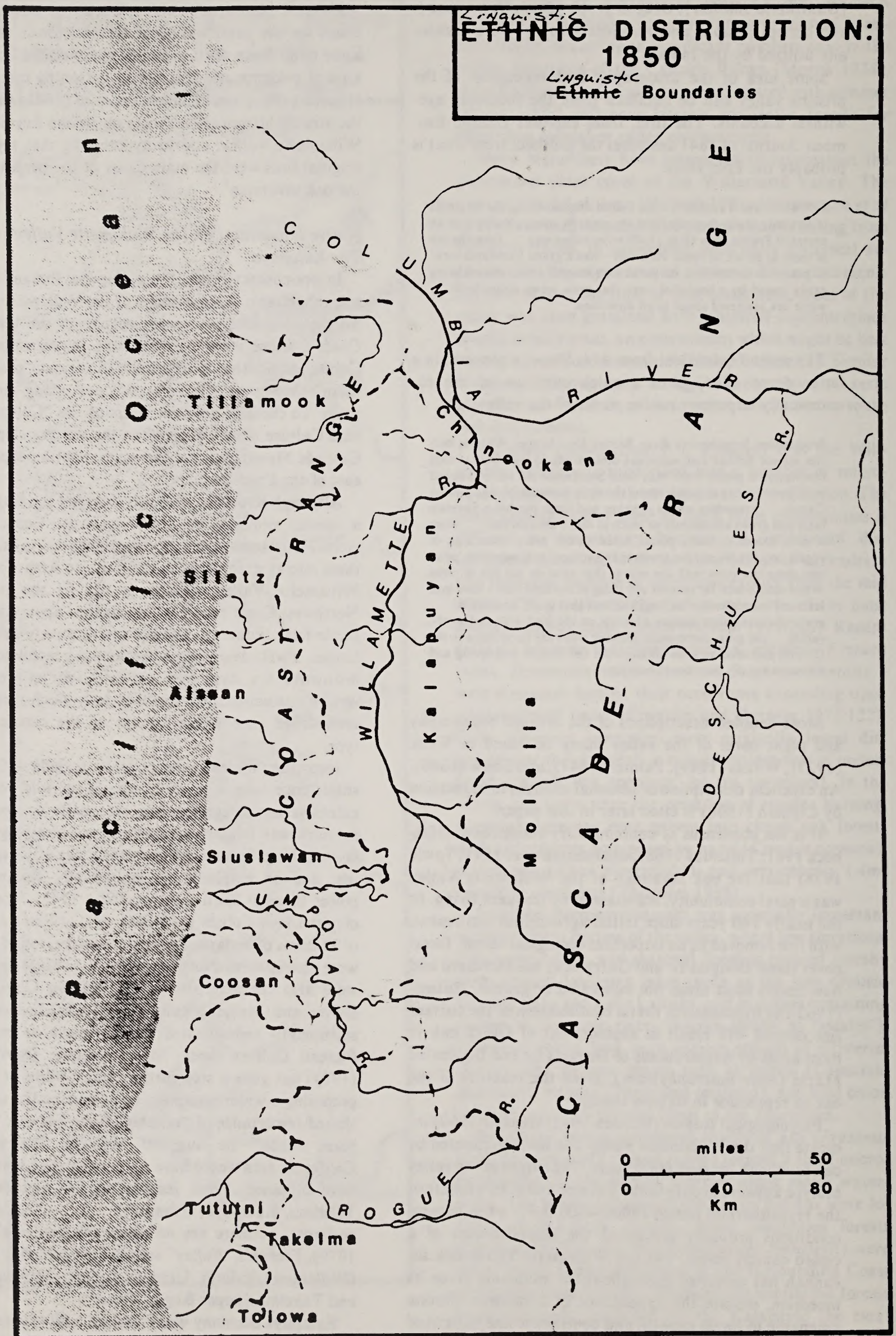
The Kalapuya

In pre-contact times, the Kalapuya Indians were the sole inhabitants of the prairies of the Willamette Valley³. To the north and west were peoples of the "Northwest Coast Culture Area": Chinookans in the valley of the Columbia; Salishan Tillamook and various "coastal Penutian" peoples (Alsea, Siuslaw, Coos) along the Oregon coast. To the east were members of the "Columbia Plateau Culture Area": Molalla on the western slopes of the Cascade Mountains; and various Sahaptin peoples to the east of the Cascade crest.

Although Kroeber (1939:30) included the Kalapuya as a special province in his "Northwest Coast Culture Area," later researchers have been inclined to incorporate them into an expanded Plateau Culture Area. In fact, the Willamette Valley Indians do not fit the traditional Northwest Coast model of dependence upon salmon as a staple food, sedentary villages and relatively dense populations, a well-developed wood-working technology and a distinctive art style, and an emphasis on wealth and wealth distinctions. Instead they look much more like an unmodified (pre-horse) variant of the classic Plateau type.

Important Plateau culture traits include a diversified subsistence base with an emphasis on wild root crops, extensive use of earth ovens, seasonally occupied semi-subterranean houses and mat lodges, sweatlodges, buckskin clothing, first fruits ceremonies, rite of passage feasting, and an emphasis on individually obtained spirit power through spirit questing (Ray 1942). The archaeologist Lloyd Collins (1951:141-44), utilizing a trait list of 31 items of Kalapuya material culture, found that 45% were shared with Northwest Coast cultures, while 87% were also characteristic of the Plateau Culture Area. Driver and Massey's culture area classification (1957) subsequently redesignated the Kalapuya as part of the Plateau Culture Area. More recently, David French (1979) has gone a step further than Collins or Driver in proposing a wider grouping. Emphasizing the underlying shared importance of "reliable ample harvests of {wild} plant foods," he suggests that "a Plateau-Valley-California area would have more unity than many writers have supposed. What features set off California from Takelma, Kalapuya, Sahaptin? . . . religious features perhaps . . . there are no distinctive features" (French 1979). French's "Valley" subprovince includes Kalapuya (Willamette Valley), Umpqua (upper Umpqua Valley), and Takelma (upper Rogue Valley).

Kalapuya economy was based on a diverse assemblage of wild plants, with a secondary emphasis on game. Un-



Source: after Beckham, S. 1979

like the Indians of the Northwest Coast Culture Area, salmon was relatively unimportant to the Kalapuya for the simple reason that the Willamette Falls blocked runs of most anadromous fish (Zenk 1976:69-70)⁴. In the total inventory of wild foods, the bulb of the camas lily was apparently of major importance (a "staple" according to Zenk, page 33), and prominent mention is given to hazelnuts, acorns, tarweed (*Madia spp.*), wapato, and an assortment of berries (especially the blackberry, *Rubus ursinus*) (Jacobs 1945; Zenk 1976:56-61). Game included two species of deer, white-tailed (*Odocoileus virginianus leucurus*) and black-tailed (*Odocoileus columbianus*) (the former being of major importance), elk (*Cervus canadensis*), a variety of water fowl, quail, and doves. Small animals and insects were "gathered." Salmon were obtained in barter with Chinookan peoples at Willamette Falls (In return for processed camas cakes and game) (Zenk 1976:52). The majority of foods were processed and stored for winter use. All in all, it was a diversified resource base, with similarities to both the Plateau (camas, other roots, and berries), and native California (acorns, hazelnuts, tarweed, and grass seeds). As we will see, burning was an important tool in both the collection and management of most of these species.

The usually mentioned figure of 3000 for the pre-contact population of the Willamette Valley (Mooney 1928:18) is certainly an underestimate. As noted by Zenk (1976:9-10), it is based upon a mis-reading of the 1806 estimates of Indian population compiled by William Clark (of the Lewis and Clark Expedition). Clark listed 2000 "Callahpeowah" and 7000 "Shoshones"⁵ as resident on the "Multnomah" (Willamette) river (Thwaites 1959:6:118-119). All these should be considered Kalapuya. The adjusted figure for 1806 thus becomes 9000, which is similar to other estimates of Kalapuya population given a quarter century later⁶. Starting from this base, and assuming minimum losses of one-third (the same percentage used by Mooney) from two smallpox epidemics prior to 1806, we arrive at a conservative aboriginal figure of 13,500. This works out to about one person for every 2.5 square kilometers (using Kroeber's figure of 33,400 square kilometers for the Willamette Valley). This ethnohistorically derived estimate is compatible with that given by Zenk for the Tualatin Kalapuya on the basis of winter-village lists (1976:10), and is similar to figures now generally accepted for hunting-gathering groups occupying similar resource areas in native California (e.g., Heizer 1978).

Direct white contact with the Indians of the Willamette Valley began in 1812, with the exploring parties of Astorian Robert Stuart and Donald McKenzie (Hussey 1967:24-25). This was contact of an intermittent nature, however, limited to seasonal forays by trappers and traders, and for nearly twenty years the Kalapuya remained relatively untouched and unaffected by white influence.

Beginning in 1831 and for each summer thereafter, the Indians of the Willamette and lower Columbia Valleys were subjected to an annual attack of a disease that is now considered to have been malaria (Boyd 1975). The effect of this exotic disease on a "virgin soil" population that had no genetic or cultural means of coping with it was de-

vastating. In 1841, explorer Charles Wilkes (using Hudson's Bay company information) gave the total Kalapuya population as 600 (1926:292). Documentary evidence for aboriginal burning of the Willamette prairies comes from both the pre- and post-malarial eras. Although the introduction of endemic malaria certainly caused a shift in subsistence strategies away from swampy areas where malarial mosquitoes had become established, and the abandonment of other regions due to gross population decline, large-scale burning by Indians continued over sizable segments of the valley until immigrant settlers forced an end to the practise in the mid 1840s.

The Kalapuya, Umpqua and Takelma Indians were removed to the Grand Ronde Reservation near the present town of Willamina in 1855. Anthropological field work among surviving Kalapuya was late and piecemeal in nature, gathered by Albert Gatschet in 1877, Leo Frachtenberg in 1913-14, and Melville Jacobs in the 1930s. The surviving field notes on subsistence (for the best-documented Kalapuya group, the Tualatin) have been assembled in Henry Zenk's "Contributions to Tualatin Ethnography" (1976). Information on Kalapuya burning practices was not gathered by the early fieldworkers, however, and there are no surviving natives who remember aboriginal burning practices (nor have there been for many years). Correspondingly, archaeological data gathered to date are devoid of useful information about the role of anthropogenic fire in aboriginal cultures.

HISTORICAL EVIDENCE

Fortunately, there are numerous references in the written accounts of early explorers and settlers which document the occurrence of regular firing by Willamette Valley Indians. Morris (1936) was the first researcher to use this historical evidence, in his history of forest fires in the Pacific Northwest. Johannessen et al (1971) quote a number of published historical works to support their thesis on the role of aboriginal firing in the maintenance of the oak savannah biotype of the valley, and their summary had been cited as proof of the aboriginal impact on the Oregon environment in many later works by geographers and foresters (e.g., Franklin and Dyrness 1973; Towle 1974, 1979; Dicken 1976).

Morris and Johannessen *et al's* list of sources on burning are not, however, exhaustive and neither study places the data in a wider ecological or cultural context. Theirs and additional historical references contain much more information than the mere fact that Indians set fires frequently and extensively. In this paper all available information, both published and unpublished, is considered in order to determine the temporal and spatial patterns of burning in the Willamette Valley. These data are then combined with what is known concerning aboriginal foraging practices, with a goal of infusing cultural meaning to the historical reports.

Most of the passages quoted below are first-hand observations preserved in the daily journals and diaries of explorers, traders, and early settlers. In these accounts, references to aboriginal burning generally appear as notational asides to the main purpose of what the writers had to say. For instance, smoke and fire were sometimes

mentioned as part of a daily weather report or as a hindrance to travel. Taken by themselves, such passages have little meaning. Considered in the context of what is known from the field of fire ecology, however, they gain substance. The journals almost always give a date and frequently mention the location or environmental setting of the observation. The picture that emerges is one which shows that Indian burning practices in the Willamette Valley were highly patterned, occurring year after year at regular times and in particular kinds of environments.

The first twelve years of White contact with the Kalapuya (1812-1824), when the fur trade was in the hands of the Northwest Company, are very poorly recorded. The only two surviving documents which contain any first-hand information on the valley and its inhabitants are the journals of Robert Stuart (1935) and Alexander Henry (1898). There are no references to Indian burning practices for this period. With the initiation of the Hudson's Bay Company's annual southern trapping expedition in 1825, however, the documentary situation changes.

From the 1826 expedition two important documents are preserved: the journals of Alexander McLeod, leader of the party, and David Douglas, a botanist who travelled with him. Departing from Fort Vancouver in early September, the McLeod expedition passed through the Willamette Valley during the midst of the summer burning season. Upon entering what was apparently the Yamhill Valley on the 18th of September, McLeod noted "several Indian habitations" and a landscape "much overrun by fire" (1961:175). On the west bank of the Willamette River near the site of Salem, the party was obliged to ford the river in order to find food for their horses because the land was "burned and destitute of grass" (ibid:175).

Over the next few days, Douglas' journal contains the following observations:

9/27 Country undulating; soil rich, light with beautiful solitary oaks and pines interspersed through it and must have a fine effect, but being all burned and not a single blade of grass except on the margins of the rivulets to be seen (cited in Johannessen et al 1971:288).

9/30 (heading south) ... Most parts of the country burned; only on little patches in the valleys and on the flats near the low hills that verdure is to be seen. Some of the natives tell me it is done for the purpose of urging the deer to frequent certain parts to feed, which they leave unburned and of course they are easily killed. Others say that it is done in order that they might better find honey and grasshoppers, which both serve as articles of winter food (1953:213-214) (cited in Morris 1936:316).

The landscape continued as above until the party reached the foothills of the Calapooya Mountains.

10/2 (McLeod) Pasture is rarely found in the course of this day none has been seen, altho' we travelled good twenty miles and had to put up along a small river that our horses might have the pickings along the margin of the woods, elsewhere the fire destroyed all the grass (1961:179).

(Douglas) ... not yet a vestige of green herbage; all burned except in the deep ravines. Covered with *Pteris aquilina* [bracken fern], *Solidago* [goldenrod], and a strong species of *Carduus* [probably *Cirsium*, thistle] ... My feet tonight are very painful and my toes cut with the burned stumps of a strong species of *Arundo* [probably reedgrass, *Calamagrostis*] and *Spiraea tomentosa* [probably ninebark, *Physocarpus*] (cited in Johannessen 1971:289).

The McLeod expedition spent the next three weeks in

the Umpqua country before moving on to California. Douglas separated from the rest of the party and in early November backtracked to Fort Vancouver through what was now a completely altered landscape. Where formerly there had been scorched plains, he found "Country open, rich, level, and beautiful" (1953:237). Fall rains had caused a greening of the prairies. The food supply – deer on the way down – was replaced on the return trip by water fowl that were stopping on their migration south at newly formed marshes and lakes. In March, when McLeod and the others returned to Fort Vancouver after spending the winter in California, they found that heavy winter precipitation had flooded large areas; "... made little progress owing to the country being inundated, every little brook or low place is full of water" (1961:218).

... our progress will be dilatory owing to the Country being entirely burnt, poor as our animals are just now in a short time hence they will be much more so (1968:11).

Near the site of Salem, on the same day, McLeod noted:

... of late the fire had committed such ravages that Scarcely any feeding is left for our Animals (1934:113).

On September 15, they left the Salem camp:

... our route led Southward, the Want of Grass made us go till 9 P.M. when we reached a Small River where there is a little Picking for our Animals (1934:113).

South of the Santiam river, on September 30th, the journal provides a hint of the nature and size of Kalapuya seasonal foraging parties:

... delay was occasioned by the Indians being dispersed in detached Parties in various directions, remote from each other, and as the object of the Party was to obtain horses, as many as possible [from the Indians], much time was lost to visit the different Parties of Indians (page 119).

For the next twelve years, despite the presence of numerous trapping expeditions in the Willamette Valley, accounts of Indian burning are relatively sparse. Three documents which do contain some information, however, are John Work's journal of a trapping expedition in 1834, and the diaries of Methodist missionaries Jason Lee and Gustavus Hines from an 1840 trip to the mouth of the Umpqua.

Along the Long Tom and Mary's Rivers, July 1st and 2nd, Work noted:

... herbage getting dry & the ground has an arid appearance; on the lower spots grass luxuriant. The Indians set fire to the dry grass on the neighboring hill ... The plain is also on fire on the opposite side of the Willamet (page 264) (cited by Johannessen 1971:290).

Lee and Hines experienced difficulties soon after leaving Willamette Mission on August 19, 1840. The plains south of the Santiam River "had been all overrun with fire a short time previous" (Hines 1852:96) (cited in Johannessen:290) which had "stripped them of their verdure, and we could not find grass enough for our horses" (Lee 1841:np).

In the summer of 1841 Charles Wilkes, commander of the United States Exploring Expedition, a scientific party

surveying the West Coast, sent a party of twenty-eight men under George F. Emmons to explore the Hudson's Bay trail connecting Fort Vancouver with the Sacramento River. After the model of the Lewis and Clark Expedition, most of the party members kept their own journals of the trip. The longest and most informative of these documents are those of Emmons and his subordinate Henry Eld (both available in manuscript from the Beinecke Library at Yale University⁷). The journals of Charles Brackenridge, Titian Ramsay Peale, and George Colvocoresses, all published, give fewer details⁸. Wilkes himself has summarized some of the main findings of the overland party in volumes four and five of the official journal of the Exploring Expedition (1849). The following quotations on Indian burning are drawn from the writings of these six individuals.

Wilkes himself did not participate in the overland expedition. He did, however, penetrate the Willamette Valley as far south as Willamette Mission (near modern Salem) where he witnessed the open prairies of the central valley. His observations are recorded in the June 9th entry from his diary:

One of the most striking appearances of the Willamette Valley is the flatness of its Prairies in some instances a dead level for miles in extent — and it becomes a problem of some difficulty to solve how they have been produced. Fire is no doubt the cause of them but the way the forests are growing around them would almost preclude this supposition as but thin belt of wood frequently occurs between extensive ones. Since the country has been in the possession of the whites it is found that the wood is growing up rapidly a stop having been put to the fires so extensively lighted throughout the country every year by the Indians. They are generally lighted in Sept. for the purpose of drying the seeds of the [blank] (sunflower) which is then gathered and forms a large portion of their food (1926:53-4).

Emmons and the other members of the overland party were forced to wait until Henry Eld, on a survey of Gray's Harbor in the north, was able to join them. This delay resulted in their starting the expedition in early September at the height of the burning season. At Fort Vancouver on July 31 Emmons expressed impatience at having to wait, stating that "the Indians were just commencing to burn the country, thereby interposing an obstacle that increases with my delay." Hudson's Bay Company employees warned the Americans that they would have problems if they waited too long. George Sinclair recorded:

I was told by an old Hunter at Fort Vancouver that they [Emmons' party] would find it very difficult to provide grass for their horses on the route, the prairies having been burned by the Indians and that another great difficulty would be the danger of laming the horses, the small stems having been exposed on the surface by the burning of the grass (Journal entry for 10/18/41).

Emmons entered the Willamette Valley in early August, and waited at Willamette Mission for a full month before Eld finally appeared. The comments from his manuscript journal, reproduced below, are similar to those recorded by Wilkes two months earlier, and apparently rise from a shared pool of information. Like Wilkes, Emmons also ascended the "Yam Hills" (apparently the modern Eola Hills) for a view of the valley. Near the present town of Newberg, on August 7th, he reported the following:

the country becoming smoky from the annual fires of the Indians — who burn the Prairies to dry & partially cook a sunflower seed — which abounds throughout this portion of the country & is afterwards collected by them in considerable quantities & kept for their winter's stock of food. The forests are also frequently burnt to aid them in entrapping their game — these two burnings combined form the greatest obstacle the travellers encountered in this country — one blocking up the way — & the other destroying the food of the animals [i.e., the expedition's horses].

While camped on the west side of the Willamette across from the Methodist Mission, Emmons' journal for August 8th recorded:

Wind light and variable — very warm, clouding over after Mer[idian] all the country west of us [present Amity area] apparently on fire from the dense volums [sic] of smoke continually rising — it is fortunate for the settlers that at this season these Prairies are not subject to heavy winds — for if they were there would be no arresting the fires that are so often kindled by the Indians.

Emmons was reporting from the fringes of white settlement in the Willamette Basin, which in 1841 were limited to the lowlands and river bottoms extending from Champoege south to what is now Salem. On August 10th he travelled the eight miles from Willamette Mission to the southern terminus of the settled area at the Mission Mill, moving between the wooded margin of the river's floodplain and the grassy high prairie.

... part of our route lay over the low & part on the high prairie bottom — through open and wood land — composed of a variety of wood — the principal portion being Pine, Fir, Ash & Oak — with some Cherry, Cotton, Willow etc. — the prairie had not yet been burnt on this side of the River & the grass had all the appearance of made hay

It was early September when Henry Eld and his men finally joined Emmons and the overland journey began. Although the explorers spent only three weeks traversing the interior valleys of Western Oregon, it was during the height of the native burning season, and all the journals are replete with references to the aboriginal practice. On September 9th, near present-day Independence, Eld made his first reference to fire.

Atmosphere filled with smoke consequently unable to see much of the surrounding country. Country much burnt ... Our route has been through what might be called a hilly prairie country, the grass mostly burnt off by recent fires, and the whole country sprinkled with oaks, so regularly dispersed as to have the appearance of a continued orchard of oak trees.

The following day, George Colvocoresses noted his interpretation of why the natives burned the plains.

The country continued level, but all the vegetation, except the trees, had been destroyed by fire, said to have been kindled by the Prairie Indians for the purpose of procuring a certain species of root, which forms a principle part of their food (1852:277).

On the 11th, the party advanced as far as the Long Tom river, Emmons recorded:

Weather warm, quite smoky ... Passed over a level prairie [south of Marys River] — perfectly barren having been burnt like most of the

country — could not determine the extent owing to the smoke which confined our view within a space of about two miles round . . . came upon the banks of a small River called the Lum-tum- buff . . . the pack animals . . . having travelled all day over the burnt prairie without water . . . rushed headlong down the banks.

The Expedition's botanist, Charles Brackenridge, found, (to use the words of his predecessor David Douglas) that burning was "highly unfavorable to botanizing" (Douglas 1904:78). The only plant life he encountered was restricted to a narrow band alongside permanent sources of water.

On the banks [of the Long Tom] grew Dogwoods, Spiraea, Willows, Alder, and close by Clumps of a large Pinus . . . procured Seed of *Madia elegans* [tarweed], but rascally Indians by setting fire to the prairies had deprived us of many fine plants (1931:57) (cited by Johannessen:290).

Travel was difficult on the prairies. The days continued "hot and foggy" and visibility, Emmons reported, was "confined . . . within a space of about two miles around." The land was "burnt and parched" (Eld), "bands of wolves were met with," and there was no water or grass for the horses. During the night of the 12th, the animals escaped and were found the next day in a "marshy place: (Wilkes 1849:5:222-223). The night of the 13th was spent at the base of the Calapooya Mountains.

. . . encamped on a fine piece of prairie grounds of about a mile and a half in length and one half mile in width which being well clothed with grass was too valuable to be passed over without giving our horses a chance at it . . . it proved to be a thick smoky evening so as to preclude all possibility of getting the North Star (Eld).

Here Brackenridge was able to collect some plant specimens.

Weather very hot and foggy. Plants: *Gentians* sp . . . *Glaucus* [saltwort] in marshes . . . *Eryngium* [wild carrot] sp . . . *Madia elegans* in great abundance. *Madia*-looking annual. flos: small, yellow, dry banks (1931:58).

Passing out of the Willamette Valley (though still in Kalapuya territory) the fires continued. The following three passages describe the fires encountered in the Yoncalla area.

9/15 Calm, sultry & smoky as ever — the air from the prairies fanning past me — some thing like the heated air from [an] oven . . . (Emmons)

9/17 the weather continues thick and smoky the sun seen only occasionally and then of a dense blood red color and looking much larger than [illegible] . . . from daylight to ten A.M. hunting the horses in the smoke . . . through valleys . . . principally oak trees with grass growing under them . . . The prairies mostly today are on fire, winding its course slowly with the wind across the plains and up the hills . . . our route lay directly through where it was burning but the grass is not thick enough to render it very dangerous, and we crossed without injury; it is well the grass is not more than it is or our route assumedly would be extremely perilous, it is probably owing to the fact that the prairies are burned every year that the grass is so thin (Eld).

9/18 . . . the flats between the rising ground is rich deep soil with Clumps of Ash and dogwood, the grass had all been burnt up by a

fire which we saw raging (sic) ahead of us and were compelled to urge our horses through it. Campd. on Billys River. Atmosphere so dense that we could not see more than 1/4 of a mile ahead (Brackenridge 1931:216).

For the next ten days, the overland party travelled through the territories of two non-Kalapuyan peoples of southern Oregon: the Athapascan Umpqua (of the middle Umpqua River) and Takelma Indians (of the South Umpqua and Middle Rogue rivers). As both groups were culturally similar to the Kalapuya and since the chronicle of Indian burning continued in detail throughout their territories, the reports are equally relevant for understanding the technology and ecology of Indian fires in the Willamette Valley. In *Umpqua* territory, present-day Douglas County, the record notes:

9/20 smoky atmosphere still . . . Encamped on the bank . . . [of] the South fork of the Umpqua . . . on a piece of very narrow prairie ground with very little vegetation or grass, and that very dry & burnt, affording an exceedingly scanty allowance for animals . . . Those of the Umpqua Mountains we have passed to day are probably from 12 to 1500 ft in height with grass extending to their summits and their tops scattered with pines and oaks . . . (Eld) . . . The Country consisted of low rolling Mts: covered with Pine & Oak trees . . . Plants: *Madia* sp: (1) leaves linear, flos: yellow, plant 2 ft. *Lupinus* sp: (1) flos: yellow, solitary on plains . . . *Vitis*. A kind of Fox Grape, fruit edible, in considerable abundance here . . . the *Laurus* was found here in large masses. (Brackenridge 1931:217-218)

9/21 . . . encamped near the south fork of the Umpqua . . . headwaters & at the foot of the Umpqua mountains. Country burnt all round, having noticed that the Indians had taken particular care to destroy all the grass within the neighborhood of the previous camping places . . . I selected intermediate places where there was some food for the horses (Emmons)

9/22 Atmosphere getting smoky again . . . ascent of the Umpqua ridge of mountains . . . lately set on fire (doubtless to obstruct us) and large trees had fallen over our path, so that we were in many instances obliged to cut our way through or around them . . . as long as the atmosphere . . . continues in its present state I feel that I am groping my way along half blindfolded (Emmons).

. . . the woods lately been on fire and before we got over were as black and as unchristian as so many Negroes from the coast of Africa. At 5 P.M. arrived at small prairie where we camped . . . (Brackenridge 1931:281-219).

The travellers were now in the valley of the Rogue River. Ecologically and culturally, this was a transition zone between the interior valleys of northwest Oregon and those of California. The flora and fauna indicate a drier climate than that to the north: pines (*Pinus ponderosa* and *lambertiana*) replace Douglas fir; black-tailed deer supplant the white-tailed variety; jackrabbits and antelope appear. On September 23rd, one of the earliest entries in the surviving portion of the journal of Titian Ramsay Peale describes a foraging unit of the Takelma Indians.

These Indians are known by the name of 'Rascals' . . . They were armed with bows and arrows (with flint points) with which they kill Elks and Deer, etc. which abound in the mountains, but their principal food, to judge by the signs must be berries and roots. They appear to be scattered in small family parties over the country and have no houses, tents or permanent residence, their only shelter being made of grass thatched on hoops about four feet high, and only capable of holding 4-5 persons sitting — or prostrate (1961:190).

On the 24th, Peale's journal gives more information on the gathering habits of the "Rogues."

... The country was mostly burned by Indians ... We travelled seven hours and halted on Young's river in a burned prairie, little or no food for the horses. Along the creek were numerous signs of Indians, old camps etc. where we generally saw piles of Mussel (*Unio* & *Anodon*) shells which seemed to indicate that such formed a considerable portion of their food. Even snail shells (*Helix nuttallii*) were found in piles where they had been roasted ... (1961:91).

One reason for Indian burning is described in all the journals for the date of September 25th. This was the collection of sap from the sugar pine (*Pinus lambertiana*)¹⁰, here found in its northernmost limits.

... over burned woods and small patches of prairie, abounding in black tail Deer, the woods here consist of Lamberts (Peale 1961:191).

... We have today for the first time fell in with the sugar pine tree, this [illegible] matter ooses [sic] from the wood of the tree not the bark & forms in little lumps on the outside where the bark has been removed, this has quite a pleasant taste & much like manna ... The indian manner of gathering it is to set fire to the tree and save the juice as it runs out, in this way they get it in large quantities (Eld).

Finally, on September 28th, at the base of the Siskiyou Mountains, the members of the exploring party observed an Indian woman setting fire to the vegetation.

... on the flank of a hill stretching to the E.S.E., in passing thro the woods we suddenly came on to an Indian woman who was blowing a brand to set fire to the woods probably, we stopped to speak to her, but she was sullen, & dogged, & made no reply, & we passed (Eld). ... saw a squaw who was so busy setting fire to the prairie & mountain ravines that she seemed to disregard us. Her dress was a mantle of antelope or deer skin, and a cup shaped cap made of rushes. She had a large funnel-shaped basket which they all carry to collect roots and seeds in (Peale 1961:192).

... we found the woods on fire in several places & at times had some difficulty in passing some of the gullys where it was burning (Eld).

Across the mountains into California and the country of the Shasta Indians, the burning continued.

Following the exceptionally well documented year of 1841, there is a two-year gap in the record of indigenous burning. In 1844, following two years of large scale migrations over the Oregon Trail which had brought over 2000 settlers to the Willamette Valley, the last documented occurrences of intentional burning are described for the Indians. All three accounts for this year describe burning or its effects in the Yamhill Valley. Jesse Applegate, a settler of 1843, established a farm on the Rick-real River. His "Recollections" contains one of the most graphic accounts of native burning extant.

... we did not yet know that the Indian were wont to baptise the whole country with fire at the close of every summer; but very soon we were to learn our first lesson. This season the fire was started somewhere on the south Yamhill, and came sweeping up through the Salt Creek gap. The sea breeze being quite strong that evening, the flames leaped over the creek and came down upon us like an army with banners. All our skill and perseverance were required to save our camp. The flames swept by on both sides of the grove; then quickly closing ranks, made a clean sweep of all the country south and east of us. As the shades of night deepened, long lines of flame and smoke could be seen retreating before the breeze across the hills and valleys. The Indians continued to burn the grass every season until the country was somewhat settled up and the whites prevented them, but every fall, for a number of years, we were treated to the same grand display of fireworks. On dark nights the sheets of flame

and tongues of fire and lurid clouds of smoke made a picture both awful and sublime (1914:69) (quoted in Morris 1936:317; Johannessen 1971:291).

The "sage of Yoncalla" (as Applegate was later known), by his dramatic treatment of this episode, gives a probably exaggerated impression of the normal intensity of the Indian fires¹¹. Though certainly productive of great clouds of smoke, they were probably usually more like the slow burn described by the more matter-of-fact Henry Eld (1841: entry of 9/17/41).

Although Applegate gives no dates for the above incident other than "late summer," collateral information indicates that it may have been late September. The manuscript diary of Alvin Smith (1844), written at Willamette Mission, due east of the "Salt Creek Gap" across the Willamette, notes in the entries for September 28th and 30th "tended to watching the fire that was burning over the country ... did chores and watched the fire." Another pioneer, James Clyman, viewed the same landscape described by Applegate perhaps a month later, as recorded in the following quotations.

11/5/44 Crossed a range of high rounded hills [probably the Dundee Hills] and where [sic] it had been burned 16 or 18 days it was now green and fair pasturage (1960:120) (quoted by Johannessen 1971:290).

Autumn rains, of course, were responsible for this quick revitalization of the vegetation.

11/9 ... the valley [Yamhill] covered in a growth of green grass, the old having been burned off not exceeding Thirty days ... the Wally of the willamet skirted with irregular Stripes of green Prairie lately burned off white not burned brown.

11/11 ... greates Quantities of wild geese seen flying and feeding on the young grass of the lately Burned Prairies which are Quite Tame and easily approached on horseback (1960:121) (cited by Johannessen 1971:291).

Clyman's diary covers almost an entire year in the Willamette Valley, until June of 1845. His very descriptive account of the natural vegetational sequence on the prairie lands will be quoted later.

KALAPUYA BURNING: THE SUBSISTENCE CONTEXT

Omer Stewart (1953, 1954, 1956) was the first anthropologist to record in detail the phenomenon of aboriginal burning. In 1953, he had "completed the first draft of an eight-hundred page manuscript, including tables and bibliography, presenting the evidence that aborigines the world over burned vegetation, and attempting to determine the effect such burning has had on the so-called 'natural vegetation' (1953:4). This manuscript, unfortunately, has never been published. Stewart's approach was cross-cultural in nature; he was not concerned with reconstructing the patterning of anthropogenic fire in local cultural and ecological systems. But his classification of burning incidents by "reasons" lends itself to such reconstruction¹². In North America:

Although fire is reported most frequently used to aid hunting — to encircle, to rouse, to stampede— fifteen other reasons for setting

fires are given. These were as follows: to improve pasture, improve visibility, collect insects, increase yield of seeds, increase yield of berries, increase other wild vegetable foods, make vegetable food available, remove or thin trees to allow other growth, clear land for planting, stimulate growth of wild tobacco, aid in warfare, produce a spectacle, and reduce danger from snakes, insects, etc. Sheer carelessness, of course, is often reported as a cause of fires (1953:43).

Fire was obviously a multipurpose tool in many precontact Indian cultures. Not all of the reasons listed here, of course, are reported for the Kalapuya, and only those that are related to subsistence pursuits will be discussed in this paper. Homer Aschmann suggests that dividing Stewart's many aboriginal reasons for burning "into immediate effect and deferred effect sets is useful" (1977:135). This division works particularly well for the Kalapuya, and will be used on this section of the paper. The "immediate effect set" includes instances where fire was used as a tool in the hunting and gathering process itself. The "deferred effect set" incorporates situations where fire was used to produce long-range future benefits (such as increased yields). Reasons in the first category were relatively obvious to early Euroamerican observers and are more or less well reported in the literature. The second category was more subtle and not so apparent to early observers. Here the hard data on use of fire by the Kalapuya are not so good. By ethnographic analogy with better-known neighboring Indian cultures, however, it is possible to make suggestive statements. When these probable uses of fire "fit" in with what we know about the Kalapuya subsistence strategy and the pre-White ecosystem of the Willamette Valley, the likelihood of their existence among the Kalapuya is strengthened.

Reasons for Burning

For the Kalapuya, the sources indicate that there were two major direct uses of fire: in the circle hunt of deer and in the gathering of tarweed. The quotation from Emmons (page 14, above) states this in no uncertain terms; the following statement from Joseph Henry Brown, a Salem pioneer of 1847, corroborates Emmons and adds some information of secondary uses of fire.

The theory that I gained from the old settlers in regard to it [Indian burning] and my own observations is this: up to 1845 the Indians had a custom of burning off the country for the purpose of driving the game and also make the grass grow better, to keep down the undergrowth of timber, and collect seeds (1878:1).

The most common deer in the Willamette Valley in pre-white times was not the same species that is found in the forested areas of the valley today. The black-tailed deer (*Odocoileus hemionus*) has supplanted the white-tailed deer (*Odocoileus virginianus leucurus*) over most of its range. The latter is now endangered – due basically to habitat loss – and limited to two small herds in the lower Columbia near Rainier and the Umpqua Valley close to Roseburg.

The most frequently mentioned method in the anthropological and historical sources of hunting this small deer was stalking by a single hunter disguised in a partial hide

of the animal. Burning might indirectly influence this method of deer hunting by producing restricted feeding areas (yards) where the animals would congregate and be more easily killed. I will discuss this usage in the next section.

Of immediate interest is the use of fire in the communal fall hunt of deer. The fire drive is widely reported throughout French's Plateau-Valley-California Culture Area. In the "Culture Element Distributions" four out of ten groups in the Plateau (Ray 1942:117), eleven out of sixteen in Northeast California (Voegelin 1942:51), and ten out of sixteen in Northwest California (Driver 1939:309) used it. I will discuss three examples: the Kalapuya, Coeur d'Alene (Plateau), and Shasta (Northeast California).

There are two references in the literature on the Kalapuya to a large scale, communal circle drive of deer. The main source for both was apparently the Santiam Kalapuya, Joseph Hudson¹³. Hudson describes the practice as it existed in the pre-malaria period (before 1831) when the Santiam still had sufficient manpower to carry out the hunt. Hudson was interviewed sometime in the early reservation period (probably around the year 1880) by newspaperman Samuel Clarke and pioneer John Minto.

Samuel Clarke was noted as a writer of popular history, and the following excerpt is drawn from the article "The Great Fall Hunt of the Willamette," which originally appeared in *The Oregonian*, and was reprinted in *Pioneer Days of Oregon History* (1905).

Old Quinaby¹⁴ and Jo Hutchins [Joseph Hudson] who lived at Grand Ronde both told how their tribes prosecuted a great fall hunt for the purpose of laying in meat for the winter. The bands that occupied the region that included the east side of the valley, from the Molalla to the Santiam, all united in this annual roundup. It required a great force of men to carry out the programme. They formed a cordon around all the territory indicated. Men were placed in position along the rivers named and including the foothills of the Cascades. The great square encircled all Marion County (as constituted today) that is not rough mountainous country. To have placed men a quarter of a mile apart would have required fully 500. They called into active service boys able to draw a bow, and old men not incapable of duty.

This annual hunt was conducted under the orders of the most famous war chief, and all others had to receive instructions and live up to them. There was considerable skill required to do this correctly and effectively . . . Possibilities were carefully calculated in advance and pains taken to plan operations early in the fall of the year, when storms were not frequent and the game easily controlled . . . At a given signal, made by a fire kindled at some point as agreed, they commenced burning off the whole face of the country and driving wild game to a common center . . . If badly managed, the game could break through and escape to the mountains . . . When the circle of fire became small enough to hunt to advantage, the best hunters went inside and shot the game (pp. 89-90; reorganized by the author for clarity) (cited in Morris 1936:317).

The second quotation, which does not mention the use of fire, but otherwise, in broad outline, corroborates Clarke, is from John Minto.

Joseph Hudson . . . pointed to a time when his people had numbered eight thousand, as he estimated, at which time and later, to the time of his grandfather, Chief San-de-am, his people used the circle hunt, driving the deer to a center agreed upon, by young men as runners, the point to drive to being selected as good cover to enable the bowmen to get close to the quarry (1900:306-307) (cited by Zenk 1976:68).

The chief problem with the Clarke account is that it is hard to believe that all of Marion County was involved in a single drive. Other than this criticism, the outline is similar to circle drives reported from other North American tribes, and is probably ethnographically sound. For instance, the following account from the Coeur d'Alene Indians of the Columbia Plateau in Idaho replicates much of what is stated by Samuel Clarke for the Kalapuya.

The Indians watch for the proper time to go all together for a hunt or 'surround' of deer . . . they determine the extent of the surround, according to the number of hunters of which the band is composed. A hunting-chief is chosen, and all his orders are thereafter executed promptly and punctually . . . When the "surround" is performed in a valley . . . the hunters form a complete circle, determining the size of it by their own number. Then they . . . burn their old rags in a hundred little fires round about, to prevent the deer from escaping from the circle. Pursued in every direction, the terrified animals flee from one clump of wood or brush to another, until finally enveloped on all sides and finding no issue, they fall into the hands of the hunters. It is seldom that a deer escapes them . . . They are easily killed with clubs, lances, and even knives . . . Sometimes as many as 200 to 300 are killed in a single surround. Ordinarily, however, the number is less. After the hunt, the flesh of the deer is divided among all the families by the chief of the tribe, or by him who has managed the expedition. The portions are regulated according to the number of persons constituting the different families. The hunter who kills the animal has sole right to the skin (de Smet 1905:1021-1022).

There are many similarities between the Coeur d'Alene and Kalapuya fire drives. In both cases, a high degree of cooperation was necessary, coordinated by a special hunt leader. The communal drives could involve a large number of people and had the potential of producing considerable return in protein, of great importance in the yearly round of subsistence activities. The Coeur d'Alene quotation also describes the post-hunt distribution of meat which is similar in outline to that reported for other hunter-gatherers¹⁵.

The fire drive was also common throughout adjacent portions of California¹⁶. Closer at hand, it was used by the Takelma of the middle stretches of the Rogue River. Ethnographer Edward Sapir cryptically states: "Not infrequently mountain forests were set afire to facilitate the driving of game" (1907:260). A more complete description is given by Roland Dixon for the neighboring Shasta.

. . . [when] the oak-leaves began to fall, men went out and set fires in circles of the hills. The ends of the curved lines forming the circles of fire did not meet, and in this opening the women stood rattling deer-bones, while men concealed in the brush were ready to shoot the deer as they rushed out (1907:431) (see also Holt in Lewis 1973:55)

Deer, principally white-tailed, was the most important source of animal food for the Kalapuyans. It is mentioned more than any other animal in Jacobs' *Kalapuya Texts*. Deer meat was apparently smoked and stored for winter use (M. Jacobs 1945:103, 251, 366, 369). The timing of the circle hunt makes sense in its closeness to the beginning of the five-month winter season (Zenk 1976:37-38) and also because it was that time of the year when the animals themselves were fattest, having gorged themselves on newly fallen acorns in the oak openings (Taylor 1956:82). The documented presence of elk on the open

prairies of the Willamette Valley raises the possibility that they, also, were hunted by the fire drive (Stuart 1935:32; Ross 1849:36).

Tarweed

A second major reason why the Kalapuya burned the prairies related to the harvesting of tarweed (*Madia* spp.), a major food source of the valley Indians. The basic information on the use of tarweed by the Kalapuya is summarized in Zenk (1976:57-59). Tarweed was also an important wild crop of the ~~Umpqua~~ and Takelma, and was utilized by many California Indians as well (Mead 1972).

Burning is always mentioned as an integral part of the tarweed gathering process, but its specific function in this context has never been made clear. The following quotations from ^{two of} the three "interior valley" peoples (i.e., the Kalapuya, ~~Umpqua~~, and Takelma) provide an overall description of what was involved.

According to Jesse Applegate, from 1844 on the Yamhill:

It was a custom of these Indians late in autumn, after the wild wheat, Lamoro sappolil [Chinook jargon] was fairly ripe, to burn off the whole country. The grass would burn away and leave the sappolil standing, with the pods well dried and bursting. Then the squaws, both young and old, would go with their baskets and bats and gather in the grain. The sappolil we now know as tarweed (1914:68) (cited in Zenk 1976:23).

George Riddle, a pioneer of 1851, describes tarweed gathering among the Takelma speakers of Cow Creek.

During the summer months the squaws would gather various kinds of seeds of which the tar weed was the most prized. The tar weed was a plant about 30 inches high and was very abundant on the bench lands of the valley and was a great nuisance at maturity. It would be covered with globules of clear tarry substance that would coat the head and legs of stock as if they had been coated with tar. When the seeds were ripe the country was burned off. This left the plant standing with the tar burned off and the seeds left in the pods. Immediately after the fire there would be an army of squaws armed with an implement made of twigs shaped like a tennis racket with their basket slung in front they would beat the seeds from the pod into the basket. This seed gathering would last only a few days and every squaw in the tribe seemed to be doing her level best to make all the noise she could, beating her racket against the tip of her basket. All seeds were ground into meal with a mortar and pestle (1920:45-46) (cited in Zenk 1976:59).

Finally, ethnographer Edward Sapir had the following to say for the Takelma:

. . . the stalks . . . of the yellow-flowered tarweed . . . were first burnt down to remove the pitchy substance they contained . . . the seeds were beaten out by a stick used for the purpose into a funnel-shaped deer-skin pouch with the mouth wider than the bottom . . . The seeds were parched and ground before consumption . . . (1907:259).

The plants were apparently burned prior to harvesting to remove the sticky resin and facilitate gathering. If the tar was a hindrance to cattle browsing in the vicinity, it must have also been so for the Indian women who gathered tarweed seeds. Burning apparently was never intense

enough to destroy the plants; most sources make a point of stating that the stalks remained standing erect. Firing may also have loosened the seeds in their cases, and parched them slightly.

The implements of tarweed harvest were similar among all three interior valley groups. All used a variation on the seed beater "shaped like a tennis racket," and carried the seeds home in a soft funnel-shaped basket slung on the back. The seeds might be first beaten into a bucket or other container; and then transferred to the back, or into the burden basket itself, held in front by the Indian women.

Once gathered, the seeds might be parched again with coals before being ground into a meal with stone mortar and pestle. Settler Horace Lyman stated that the meal "resembled pepper in appearance, but was sweet tasting" (1900:325). Jacob's Santiam Kalapuya informant told him that ground hazelnuts and camas might be mixed with the tarweed meal. The processed seeds were then stored for winter use (Jacobs 1945:20)¹⁷.

The Indians apparently valued the tarweed highly. Gatschet's field notes on the Tualatin state that tarweed patches were individually owned, and that each plot "might produce 10-20 bushels of seeds" (Zenk 1976:58). Tarweed therefore received an unusual amount of attention from the Kalapuya: unlike other utilized grass seeds, which were simply beaten off when ripe, *Madia* required burning; and given its high desirability and limited occurrence (at least in some areas) plots of wild tarweed, unlike other food plants, might be considered family or personal property. Elsewhere, species of *Madia* were likewise subject to intense attention. In Chile, among the Araucanian Indians, according to Steward (1950:495), tarweed was domesticated. The Araucanians grew *Madia sativa* (which is also native to California and Western Oregon)¹⁸ for its meal and as a source of oil. In recent times in Chile *Madia* has been cultivated for its oil, described "as clear as the best olive oil" (Molina 1808:95).

Insects

A third direct reason for native grass burning was that it aided in the collection of grasshoppers. Melville Jacob's *Kalapuya Texts* notes:

When it was summertime they burned over the land when they wanted to eat grasshoppers. When they burned the land, they burned the grasshoppers (too). And then they (women) gathered up the grasshoppers, and they ate those grasshoppers it is said (1945:26) (cited by Zenk 1976:131).

The method of capturing grasshoppers by field burning was widespread in basin and interior valley regions. It is also reported ethnographically for the Takelma (Sapir 1907:260; 1909:93,95), Shasta, and Achumawi-Atsugewi (Voegelin 1942:53). A more descriptive account is the following, from the "Upper Columbia and the Interior of Oregon" (Sahaptin and/or Paiute) in the 1850s.

... [the Indians] collect a great many large black crickets, and grasshoppers by the bushels ... I have often seen them encircle the grasshoppers in a ring of fire by igniting the grass; their wings are

scorched by the blaze, and they fall to the ground, when the Indians gather around, collect them and eat them ... [or] they put [them] into a mortar with acorns or bread root, and pound into a mass which is then kneaded, placed on a board and baked for bread — the legs of the grasshoppers and crickets making a very rough crust (Armstrong 1857:119).

Although the Indians also used fire in the collection of yellowjacket larvae, it did not require burning of sizable areas. Jacobs' fieldnotes state that a fire was set atop the underground nest, driving out the adults and roasting the larvae. Douglas' statement that the Indians burned to get "honey" (1953:213-214) is a probable reference to this mode of collection (Zenk 1976:134). The Takelma had an identical practise (Sapir 1907:260). Also reported from the basin and interior valley areas is the use of smoke to drive rodents (ground squirrels in the Willamette Valley) from their burrows (M. Jacobs nd; Stewart 1941:369; Voegelin 1942:53).

The above three types of burning yielded immediate rewards — venison, tarweed seeds, and roasted insects¹⁹. The Kalapuya also burned for reasons that did not produce instant results. The ground under oak trees was regularly fired to remove brush and facilitate future acorn gathering. Some areas were burned to make individual hunting of deer easier. Patches of ground in woody areas were burned prior to the broadcasting of tobacco seeds. And, by ethnographic analogy with the Shasta (James 1903:79) and others, it is probably the case that the Kalapuya burned to promote growth of desirable basket-making materials and to create environments favorable to the growth of wild berry and root crops.

Acorn Gathering

Two wild nuts — hazel (*Corylus cornuta*) and acorn (*Quercus garryana*) — were utilized as food by the Kalapuya. Acorns, a staple crop in native California, were relatively less important to the Indians of the Willamette Valley. The Kalapuya lacked both the variety of acorn species and the complex methods of preparation used by California Indians.

Nevertheless, the descriptions of oak openings found in the journals of early explorers and settlers indicate that the Kalapuya were concerned enough about the acorn harvest to follow the California practise of burning underneath the trees. The following quotation by Joel Palmer, a pioneer, implies much the same.

Upon the slopes of these [Eola] hills are several thousand acres of white oak from six to twenty feet in height, some of them large diameter, and all with large bushy tops: the ground being covered with grass, at a distance they look like old orchards (1847:173)

Samuel Hancock, in 1845, also commented on the unusual shape of the oak trees in the Willamette Valley: "very low with bushy tops ... [that] reminded me of the apple trees at home" (1927:46, 48). Regular low-intensity burning of the oak understory apparently produced standardized, well-groomed oak groves which resembled fruit and nut orchards cared for by the more complex techniques of arboriculture familiar to the American settlers.

The ethnographic information on burning in oak groves by the Indians of Northern California is relatively detailed, and provides a model for the practise among the Kalapuya. The Karok reason for burning under the oaks was as follows:

Mamie Offield says the trees are better if they are scorched by fire each year. This kills disease and pests. Fire also leaves the ground underneath the trees bare and clean and it is easier to pick up the acorns (Schenck and Gifford 1952:382).

The literature on the Tolowa states:

Burning under trees to make acorns drop off; also to kill parasites on or underneath trees (Driver 1939:381).

Before leaving an oak grove after the annual acorn collection, they burned the grass over the entire flat. Tolowa informants claim that this reduced underbrush and kept the grass from growing too high, so that the fallen acorns could easily be located during the next year's harvest (Gould 1981:442).

Although the expressed reason for burning given by native informants was to facilitate gathering, the removal of shrubby growth would have other effects as well. Lewis (1973:19) notes that firing, by reducing competition from other plants, would cause an increase in acorn production. In the Willamette Valley Samuel Hancock was so impressed with the heavy production of acorns in the oak openings that he states "such is the abundance that I have no doubt but that the Indians and bears chiefly subsist on the products of these trees (1927:48). Joseph Henry Brown recalled the "very heavy mast of acorns" in the oak openings around Salem in the late 1840s, which, in the absence of continued burning, sprouted and grew into oak forests (1878:2).

The acorns were not, of course, eaten by the Indians alone, as the passage from Hancock indicates. Bears and rodents favor acorns, but more importantly from the viewpoint of the Kalapuya, so do the deer *Odocoileus virginianus* and *columbianus*. In fact, many of the modern constituent under-story species in valley oak groves are favoured deer browse (including various berries [*Amelanchier* and *Rubus spp.*], vine maple [*Acer macrophyllum*], and hazel) (Taylor 1956:202, 554-555; Thilenius 1968).

Deer Habitat

This seems to be an appropriate place to return to the problem of fire and deer hunting. Besides the communal fire drive, several references suggest that the Indians of the Willamette Valley and adjacent areas maintained, by controlled burning, a variety of micro-habitats which simultaneously facilitated the hunt and were favored by deer. These micro-habitats included prairie copses and fir groves, cleared forest understories, and burned over grassy areas.

In reference to the first it will be recalled that David Douglas noted that the prairies were burned "For the purpose of urging the deer to frequent certain parts to feed, which they leave unburned and of course they are easily killed" (1953:214). Similarly Lewis Judson described isolated groves of Douglas fir in the northern portion of the valley which were purposefully excluded from burning.

These fir groves had been found necessary by the Indians to induce deer and other wild game to stay in the valley. The groves were undisturbed by fire . . . The Indians burned right up to imaginary lines, but never was the fire allowed to go past or get out of hand. So some authority must have existed among them because biennially the prairies were burned (Strocut 1955:21).

Understory burning along forested riverbanks was reported by one observer as being important for maintaining elk and deer populations. A contrast was made between the appearance of previously burned and, in the absence of Indian practise, unburned areas in the Pudding River Area during the mid- nineteenth century.

Elk were once very abundant along the placid stream and the ground was strewn with their cast antlers in every direction. Although well timbered this was all open woods when Mr. Cox first saw it [-1846]. There was no underbrush. One might ride a horse anywhere and a deer might be seen and followed without impediment . . . The country was kept thus open by the Indians who were compelled by the whites to quit burning it over; then the brush sprung up . . . (Cox 1846).

Ethnographic descriptions from neighbouring peoples inhabiting more densely forested environments emphasized the clearing of undergrowth to facilitate the hunting of deer. Thus the Coos-Kalawatset informant Frank Drew told ethnographer John P. Harrington that "The Inds. used to keep all the brush of all the Sius[law] country burned down so there was no retarding underbrush & deers were then visible from afar" (uncatalogued ethnographic data: notes in possession of Henry Zenk). Omer Stewart's Klamath informant stated that brush was burned to facilitate hunting: "Now I just hear the deer running through the brush at places we used to kill many deer. When the brush got as thick as it is now, we would burn it off" (1956:119).

Like the clearing of the oak openings to facilitate acorn gathering, the firing of certain environments to make hunting easier had less immediate consequences for local environments. Regular burning promoted the growth and regrowth of tender grasses and forbs favored by browsing animals. Recorded native accounts have emphasized the importance of fire to the hunt. Others, however, indicate that the Indian had delayed returns in mind when they burned for deer. DuBois' description for the Tututni ("Ground burned over to produce a better crop of grass to attract wild game."nd) and Drucker's for the Tolowa (cited by Lewis, 1973:63) fall in this category, as does the following, for the Sahaptin Umatilla, recorded by a French traveller in 1853.

A la fin de l'ete il incendie avec encore plus de facilite les prairies entieres; mais on sait qu'ici il y a un but d'utilite: quelques semaines apres, une nouvelle herbe verte et savoureuse a repousse, plus rich en qualites nutritives et preferee par le betail . . . (Saint-Armant 1854:264).

One of the most profound effects of annual burning in the Willamette Valley was to encourage the regrowth and consequent year-round availability of grasses used for forage by deer and elk. Later, in a discussion of the seasonal round in the Willamette Valley, I will present documentary evidence for the year-round availability of pasture in pre-contact times.

Deer are often described ecologically as being inhabitants of "edge" environments. Such "overlap" zones are characterized by a mixture and consequent diversity of species, both plant and animal. The Indian pattern of burning in the Willamette Valley produced an open prairie, interspersed with stands of oak and isolated fir groves, cut by riverine woods of ash and alder and bounded by mountain forests of Douglas Fir. This environmental mosaic was characterized by an unusual abundance of "edges," and consequently provided an optimum habitat for edge species such as the native white-tailed and black-tailed deer.

Tobacco Cultivation

Tobacco occupies a somewhat anomalous position in Kalapuya subsistence practises since it was the only species which was both planted and grown fully by "agricultural" methods. Burning was an invariable component of tobacco cultivation.

The basic source for tobacco growth in the Willamette Valley is David Douglas' journal. In late August 1825, near the "village of the Calapooie Indians . . . twenty-four miles above the [Willamette] falls" (1953:59) Douglas reported the following:

An open place in the wood is chosen where there is dead wood, which they burn, and sow the seed in the ashes . . . They do not cultivate it near their camps or lodges, lest it should be taken for use before maturity . . . fortunately I met with one of the little plantations and supplied myself with seeds and specimens without delay. On my way home I met the owner who, seeing it under my arm, appeared to be much displeased, but by presenting him with two finger-lengths of tobacco from Europe his wrath was appeased and we became good friends. He then gave me the above description of cultivating it. He told me that wood ashes made it grow very large . . . Thus we see that even the savages on the Columbia know the good effects produced on vegetation by the use of carbon (1953:141).

Early ethnographer Leo Frachtenberg's 1913 field notes for the Marys' river Kalapuya record the following:

Rotten logs burned up and tobacco-seeds put in without spading. Occasionally place stirred up with stick. Each family planted for itself. When leaves ripe, they pull them out and dry them.

Nicotiana quadrivalvus ("N. rustica" in Douglas) was also planted in burned-over areas by the Upper Chinook (French 1957:5), all of the Southwest Oregon Athapascans (Barnett 1937:175), and the Takelma and Shasta of the interior valleys to the south (Sapir 1907:259; Voegelin 1942:92).

Douglas' passage shows that the Kalapuya were fully aware that ash acts as a fertilizer for planted seeds; and, it seems reasonable to assume, for seeds and rhizomes as well. This knowledge was certainly possessed by other West Coast hunters-gathers who grew tobacco as well.

As the above examples imply, the Willamette Valley Indians must have had some understanding of the long-range effects which periodic firing had on the health and productivity of selected species. Burning oak groves to remove brush and refuse to make acorn gathering easier also reduced competition from other plants, killed parasites and encouraged a higher level of acorn production.

Firing areas to shoot deer more easily resulted in increased browse and pasturage for larger numbers of deer and elk. And, according to David Douglas, the fertilizing effect of wood ash on future tobacco propagation and growth was fully understood by the Indians.

Despite a lack of direct documentary evidence for the Kalapuya, based on the evidence available for like subsistence strategies (Lewis 1973), it is highly probable that Willamette Valley Indians intentionally burned limited areas to promote the growth and increase the yield of three additional classes of economically useful plants: hazel (*Corylus cornuta*), some species of berries, and many root crops. All of these species are early succession plants which colonize recently burned or disturbed areas. As a group, they are characterized by rapid growth; and, in the absence of periodic burning, are at a competitive disadvantage with more long-lived woody species.

Hazel

The evidence that the Kalapuya burned to effect hazel growth is most suggestive. The plant is an early fire follower, and was important to the Kalapuya both for its nuts and as a source of basketry material (Zenk 1976:89).

Corylus cornuta in the Willamette Valley today is a common constituent of the understory vegetation in stands of *Quercus garryana* (Thilenius 1968). It is also reported as being "Partial to well-drained hillsides, old fields, slashings, and burned over areas" (Eliot 1938:384). Once established, hazel grows rapidly and produces a profusion of suckers. Nut-bearing ordinarily does not commence until the fifth or sixth year; and in cultivated varieties, suckers are removed to encourage nut production (Oregon State University 1978:20).

In all of aboriginal Western Oregon and Northern California, hazel withes were an important material in basketry. In surviving accounts, the hazel used is invariably described as being new growth, harvested from plots which had been burned over the year before. This is the case for the Karok (Schenck and Gifford 1952:386), Shasta (James in Lewis, 1973:63), Tolowa (Gould in Lewis 1973:65), and the polyglot coastal natives of the Siletz Reservation of Oregon (Kasner 1977:40-41).

Hazelnuts were gathered by the Kalapuya in August and stored for winter use. Ethnographic data do not indicate that burning was a part of hazelnut collection in the Willamette Valley, though it is reported from elsewhere in Western Oregon²⁰. DuBois' unpublished "Tututni Ethnography" describes burning over hazel-growing areas prior to nut collection in order to roast the nuts (nd:np). Evelyn Dickson's *Food Plants of Western Oregon Indians* mentions burning of hazel patches "after [nut] gathering" by "some Oregon Indians" (affiliation not given, though Dickson's informants included Southwest Oregon Athapascans, Kalapuya, and Molalla) (1946:1730). Burning after harvest may have served as a "cleaning-up" operation, not unlike its function in the oak openings. Whether performed before or after harvest, however, firing would have the secondary effect of removing refuse, competition, and smaller branches and suckers; and promoting a greater production of hazelnuts the following year.

Berries

Like hazel, most of the berries utilized by the Kalapuya were early succession plants that favor recently burned-over areas. And like hazel, they grow more rapidly and bear more fruit when competing plants have been reduced. For the Kalapuya, important species included, in open areas, the wild blackberry (*Rubus ursinus*) and strawberry (*Fragaria chiloensis*); and in forest clearings, various species of huckleberry (*Vaccinium*), salal (*Gaultheria shallon*), blackcaps (*Rubus leucodermis*), thimbleberry (*R. parvifloris*), and salmonberry (*R. spectabilis*) (M. Jacobs 1945). Some of these berries (*Rubus ursinus* and *Vaccinium*) were dried and stored by the Kalapuya; others were eaten fresh off the vine.

There is considerable evidence that neighboring peoples burned limited areas to encourage growth of berries. Elizabeth Jacobs' Tillamook field notes state:

Every few years the berry pickers would burn over the salal or short huckleberry patch. That meant no berries there next season, but a greatly improved crop the second year. This was done to improve blackberry patches as well; these vines bore more lavishly the immediately following season (Jacobs Collection box 76, folder 76.13, p. 23, notes in possession of Henry Zenk).

Upper Skagit informants in the northern part of Puget Sound recalled that forest clearings were burned over "in a carefully controlled way" to encourage the growth and increase the productivity of various species of berries (J. Collins 1974:57). Upper Chehalis informants stated that prairie areas were burned for the express purpose of promoting the growth of blackberries (Adams 1926-27). Burning to "increase yields of wild huckleberries" was practised until recently in areas of the high Cascades of Oregon and Washington by Sahaptin peoples from the Columbia Plateau (French 1957:1). Fires were started in October when the huckleberry harvest was complete. French states that the "Indians had a thorough understanding of the ecological relationships" involved (ibid: 3).

Roots

By removing competing woody species, regular burning also favors the growth of a number of wild roots eaten by the Kalapuya. These include the liliaceous species camas (*Camassia quamash*) and wild onion (*Allium spp.*) as well as the tuber of the lupine (*Lupinus spp.*) and the rhizome of bracken fern (*Pteridium aquilinum*). From Whidbey Island, the San Juan Islands and the Victoria area there are ethnographic and historic accounts of burning open areas to encourage the growth of both camas and bracken fern (R. White 1975; Suttles 1951; Grant 1849; Turner 1975). In the Willamette Valley the closest we come to a statement documenting that Indians burned to encourage growth of wild roots is George Colvocoresses' (1852) aforementioned suggestion that fire was necessary "for the purpose of procuring a certain species of root." John Minto's interpretive statement on the reason for burning might be useful here as well. According to him "Fire was the agency used by the Calapooia tribes to hold their camas grounds for game and [waterfowl] . . ." (1908:152).

The Seasonality of Burning

In order to provide a context for the stated and inferred reasons for aboriginal burning in the Willamette Valley, a framework of timing must be established. The context of time is examined in two ways: the yearly round of subsistence activities and the seasonal pattern of plant successions.

From the historical sources quoted above, it is apparent that native burning in the Willamette Valley was a phenomenon of late summer and early fall. There is no record of it occurring at any other time of the year – and this may be as much of a climatic as a cultural factor. The earliest date on record is the second of July (from John Work, 1834), and the latest is Clyman's (1960) (assumed, not witnessed) date of the 20th of October. Hines and Lee and the members of the Wilkes Expedition encountered the most intense burning during late August and early September (of 1840 and 1841, respectively). The burning season was over by that time of year when the Douglas-McLeod expedition travelled through the valley in late September (of 1826).

Subsistence Round

There is no detailed eyewitness account of the Kalapuya subsistence round. What information we have is incomplete and inferential; and comes from two sources: ethnographic and archaeological. For the Tualatin Kalapuya, Zenk (1976:40-41) located a yearly calendar in the ethnographic field notes of Albert Gatschet. This calendar shows that the Tualatin year was divided into halves, corresponding to the dual division of wet and dry seasons. From November through April, the Tualatin resided in "winter villages" located in the wooded (and thereby sheltered) tier along the banks of important northwestern tributaries of the Willamette. Tualatin winter villages were apparently composed of multi-family plank houses, like those of their Chinookan neighbors to the north; however, the surviving evidence from the southern Kalapuya area does not allow us to specify winter-village house type (Zenk 1976:140). We are similarly in the dark as to size of aboriginal social groups for either the winter village or summer foraging units.

Archaeological research by John White (1975) has clarified the nature of local movements during the dry half of the year. White classified recent archaeological sites in the upper Willamette Valley by activity, environment, and seasonality; and arrived at four distinctive types. Wet season camps were located in the forested strands of the major river tributaries. For the dry half of the year, there was apparently a considerable movement from one environmental setting to another to take advantage of seasonally and locally available wild foods²¹. Three environments and three site types are involved. On the low, wet prairies (White's "primary flood plain") were the multi-activity sites that White deems "base camps." Pits for roasting camas, an exceedingly important food, gathered in May and June, are found here. Located along the margin between the grasslands and the forests are White's "valley edge" sites, where hunting seems to have been the most important activity. Poorly known are the

dry prairie ("narrow valley plain") sites. It is here that grinding implements – mortars and pestles – implying seed and nut processing, are concentrated. The dry prairies and the grasses and oaks that were found on them were apparently subjected to the most frequent and widespread burning by the aborigines.

Seasonal Succession

As mentioned before, James Clyman's diary for 1845 and 1846 is an exceptionally good source on the seasonal floral succession in the Willamette Valley before its ecology was significantly altered by the white man. By following his notes, it is possible to get an idea of the sequence of wild foods that were available to the Kalapuya throughout a typical year, and by considering the known facts about anthropogenic burning, to make some statements about the impact which this had on plant succession.

As the record shows, most burning occurred in late August and early September. Clyman's journal in the valley begins on the 2nd of November, at a time when rains had already caused the rejuvenation of large portions of the landscape.

11/5 (in the Yamhill Valley) I walked over the green hills which were here and there dotted with cattle and horses feeding on the young grass now about three inches high and thick and thrifty as the summer growth of the western Prairies. Likewise great quantities of water fowl seen on the low ground such as geese duck Brants and Cranes making fine amusement for the Sportsman (1960:122).

The "young grass," of course, was fire induced, not seeded by the white man. One of the major environmental effects of summer burning was to produce this secondary late fall growth of wild grasses. Fertilized by ash, the fall grasses were tender and nutritious. This second growth grass was certainly a major winter supply of food in aboriginal times for wild deer and elk, and probably helped support a larger year-round population of these herbivores than would be possible under natural, non-fire conditions. Most of the wild grass species that are assumed to have been common in pre-white times in the Willamette Valley have a tendency to become tough, unpalatable, or even dangerous (such as squirreltail) to grazing animals in the fall. Annual firing, of course, would eliminate this disadvantage (USDA 1937 various pp.).

Because the autumn regrowth of grass was also beneficial to cattle, it was frequently noted in the journals of the early settlers of the valleys. Two other accounts follow, from Joel Palmer, describing the Dundee hills of Yamhill County in 1845; and George Riddle, on the Cow Creek valley of the upper Umpqua drainage in 1851.

... the grasses on these hills are a species of red clover, that grows in the summer season about one foot high, and a fine grass, which after the clover disappears, keep them clad in green during the winter. They thus furnish a perpetual supply of food for cattle the whole year (Palmer 1847:170).

It was near the first of November 1885 that we settled upon the land now known as Glenbrook Farms ... At that time Cow Creek valley looked like a great wheat field. The Indians, according to their custom, had burned the grass during the summer, and early rains had caused a luxuriant crop of grass on which our immigrant cattle were fat by Christmas time (Riddle 1920:37).

Clyman (1960) also mentions "great Quantities of water fowl ... such as geese ducks Brants and Cranes." The Willamette Valley is part of the Pacific Flyway, traversed by birds flying south in October and north in March. Some of the most common varieties on the October flyway today are the mallard, pintail, wigeon, teal (two species), and the Canada goose (Linduska 1964:238). In Clyman's time, other species, such as the whistling swan and sandhill crane, now rare, were probably more common. Many of these waterfowl also benefitted indirectly from the practise of large-scale burning. Geese, especially (as is obvious in an earlier Clyman quote) will feed on tender young shoots of grass favoured by fall burning. Various studies have shown that the food supply and nesting habitat of many species of ducks improves as a result of thinning and removal of woody plants through burning (e.g., Leopold and Bradley 1974:33). John Minto recalled:

... the millions of geese, brants, cranes and swans which wintered in Western Oregon. To me it seems easily unbelievable by a person coming here now to state the quantity of waterfowl, cranes, curlew and snipe which wintered on the grasses and roots of the damp lands of valleys and the sloughs, ponds and streams sixty-four years ago [1846] (1908:152).

A second passage from Clyman (not dated) noted that migratory birds were equally as common in the spring:

... waterfowl is plenty Beyond all conception in the rainy season all the Lowlands being litterly covered they all move to the north and east during months of April and May (Clyman 1960:136).

Clyman's (1960) and Minto's (1908) descriptions both indicate a much larger duck and geese population than we have today. How much of the decrease is due to hunting and how much to loss of habitat is hard to say.

The spring sequence is as follows:

3/1/45 ... the hills are now fast becoming dry, green, and pleasant the grass which spread itself so nicely over the surface of the earth last fall is now beginning to shoot up and lengthen out (page 138).
3/13 Noticed five different kinds of small vegetables in full Bloom to day.

3/18 the hills handsomely rounded smoothe and thickly coated with green grass.

3/21 Strawberries in bloom and the hills completely covered with small flowers mostly purple and yellow (Clyman 1960:139).

These passages are notable for their description of the early regeneration of native prairie grasses. This phenomenon was noted by other pioneers as well. Twelve years earlier, on February 22, 1833, one of the first settlers of the Salem area recorded "Extensive plains, well covered with grass interspersed throughout with oaks crowned with mistletoe ... in favorable spots the grass has grown six inches" (John Ball 1833: letter of 2/22/33, published and unpublished versions, OHS Mss 195).

Returning to Clyman's diary:

4/21 great Quantities of Firr Grouse on the hills. these grouse are fine eating much resemble a Pheasant [ruffed grouse] in appearance but are nearly double the weight (page 142) [these were probably blue grouse].

5/6 the Hills have been for some days completely red with the clover now in full bloom

5/10 I rode through the entire upper settlement of the East of the

willhamet [Waldo Hills?] and was highly pleased with the beautiful variety of hill and valley so softly varied and intermingled with hill and dale as Likewis timber and Prairie all luxuriently clothed in a rich and heavy coat of vegetation and litterly clothed in Flowers the upland in yellow and the valleys in purple. the Quantity of small flowering vegettles is verry remarkable and beyond all conception (Clyman 1960:143).

A phrase from Wilkes, describing the Eola Hills on June 6, 1941, should help in the identification of the upland plants. "The hills were covered with wall-flowers, lupine, scilla, and quantities of ripe strawberries" (1849:4:358).

Despite the designation "purple" (blue is more likely), the flowers in the valleys were almost certainly camas, the Kalapuya "staple," the generation of which was favoured by burning. In a later entry, Clyman (1960:152) gives the following information on its former abundance.

Ten or twelve acres of cammac in one marsh is quite common and in many instances it will yeild 20 Bushel to the acre . . . these extensive fields are always on wet land and in many places no other vegetable is found to intermix with it.

The Tualatin calendar collected by Albert Gatschet (Zenk 1976:40-42) shows that camas was harvested from the beginning of March, when the first shoots appeared, throughout the summer. The most intense activity was apparently in late May, when the plant was in flower. It should be noted that by late summer, when gathering was completed, many camas marshes would be dry and susceptible to burning.

By early June, another sort of flora had reached maturity, according to Clyman:

6/6 . . . observed quantities of wild pigeons feeding on the grass seeds several kinds of which are fully ripe (page 154).
6/8 (on the Long Tom?) Passed over a fine undulating country handsomely and thickly coated with grass some having the appearance of rye and timothy all kinds However covered in seed which [is] rather remarkable for it is well Known to all the western states that but few of Prairie grasses are laden down with seed and those grown in the oak Hills the more certain (1960:157).

Although the band-tailed pigeon definitely fed on grass seed, we have no direct documentary evidence that the Kalapuya utilized any seeds other than tarweed and wild sunflower, both available later in the year. Indirect evidence, however, exists in the form of Kalapuya seed-gathering equipment and locally abundant native grasses whose seeds were widely gathered in California. The seed-beater and conical burden basket which the Kalapuya are reported to have used in the gathering of tarweed (page 26, above) are identical in form to those used to collect a wide variety of seeds by native Californians. At least two genera of native grasses – the bromes (*Bromus*) and wild ryes (*Elymus*) – which are common to the Willamette Valley, were important food plants of California Indians (see especially Schenck and Gifford 1952:379-380 [Karak] and Chesnut 1902:312 & 597 [Yuki]). Wild barley (*Hordeum*) and needlegrass (*Stipa*), sometimes collected in California, were also present in the pre-white Willamette Valley. The bromes seed in July, and others do as well.

It was early in July that Work's 1834 journal first

reported "herbage getting dry" and a few days later "the Indians set fire to the dry area on the neighboring hill" (1923:264). The implication is that there was selective burning at this early date of at least some of the grasses that had outlived their utility. In contrast, the burning of tarweed plots occurred only after that seed had ripened in early September (re Brackenridge 1931:57). The extensive burns associated with communal deer hunts took place after the fawns had been weaned and the animals had fattened on acorns (Taylor 1956:74 & 82), and before the start of the fall rains – that is late October.

Reconstructed Burning Schedule

Given the above ethnohistoric and ethnographic information, it is possible to reconstruct a probable burning schedule for the Kalapuya. In late spring and early summer the Indians were probably concentrated at "primary flood plain" sites in the wet prairies, where root crops such as camas were collected and processed. There was no burning at this time. During mid-summer (July and August) the focus shifted to the dry prairies, and "narrow valley plain" sites were more intensively occupied. Burning in July and August was apparently sporadic, most likely occurring after the harvesting of seasonally and locally available wild foods (grass seeds, sunflower seeds, hazelnuts and blackberries), in limited areas. The immediate effect of the early burns would be a "cleaning up" process; the long-term result would be to facilitate the re-growth, in future seasons, of the plants involved. In late summer fire was used, on the high prairies, as a direct tool in the gathering of tarweed and insects. This was followed, in October, by firing of the oak openings, after acorns had been collected. Finally, from the "valley edge" sites, the Kalapuya initiated large-scale communal drives for deer, which provided a winter's supply of venison. The sequence ended as they returned to their sheltered winter villages along the river banks.

CONCLUSIONS

Omer C. Stewart has stated that "Historical and anthropological records indicate that nearly every American Indian tribe set fire to the grass and woody vegetation in the area it occupied" (1953:43). The data compiled here further support this contention for those peoples of the Northwest Coast and Plateau culture areas occupying the region south of the 49th parallel. Available records indicate that, out of a total of forty identifiable ethnolinguistic units in the region, twenty-six (65%) practiced some kind of patterned burning – exclusive of burning as a part of tobacco cultivation. The total number that actively managed plant and animal resources with fire is probably larger, since historical and ethnographic data on some groups in this region are exceedingly sparse.

Not surprisingly, the poorest record of patterned burning concerns coastal peoples, those tribes that occupied the wettest environments. Yet, there are records for Siuslaw (Harrington n.d.), Tillamook (E. Jacobs n.d.), and Quileute (Regan 1934), who burned to maintain forest openings as yarding areas for deer and to encourage the growth of berries. It appears that most of the Columbia

Plateau peoples practiced some form of scheduled burning (author's notes). Although the fire drive is the most frequent reason given for burning in this region, it is probable, considering the importance of wild plants in Plateau subsistence strategies, that burning was important in other contexts as well.

Fire was most intensively used by the Northwest Indians who inhabited the Gulf of Georgia-Puget Trough and Willamette-Umpqua-Rogue-Klamath interior valleys. This entire zone, found between 122 and 123 degrees west longitude, is characterized by dry summers and a relative absence of lightning storms. There is a respectable amount of historic and ethnographic data on the use of fire by the Straits people of the Victoria-San Juan Islands-Bellingham areas (author's notes; Turner 1975; Suttles 1951). Articles by R. White (1975) and Norton (1979) present persuasive evidence for the importance of patterned burning by Puget Salish speakers, particularly on Whidbey Island and the Nisqually Prairie. The Upper Chehalis are documented as having regularly fired the grassy prairies of the Centralia-Chehalis area (Adamson 1926-27). Throughout the northern region, burning was practiced especially to encourage the growth of wild roots and berries.

Some of the most impressive evidence for the aboriginal use of fire in the Northwest, however, comes from that special cultural subdivision which French (1957) calls the "Interior Valley Province." The historic records for the Kalapuya and the ethnographic data on the Karok, in particular, suggest that fire was important in a wide range of subsistence-related activities. The research of Johannessen *et al* (1971) indicates that the Indian use of fire in the Willamette Valley was so frequent and widespread that it maintained what ecologists would call a "fire climax" biotype.

The evidence for patterned burning by native Californians assembled by Lewis (1973) provides highly suggestive, if not in fact corroborating evidence for patterned burning within the functionally equivalent environments occupied by the coastal Indians of western Oregon. In a similar though obverse way, the burning of prairies in the Willamette Valley provides like corroboration for fires having been used by Indians in California's Central Valley, an environmental zone mentioned as having been regularly fired but which otherwise lacks detailed descriptions of indigenous fire technologies. The gap in information is in part provided with the example of Kalapuya practises. Given the descriptions and interpretations of California's prairies as being dependent upon fire (e.g., Jepson 1921), plus the fact that the surrounding zone of oak-grasslands was burned in an equivalent way to what is reported here for the Willamette Valley, it is quite unlikely that the prairies of California were burned in significantly different ways from those in Oregon. Certainly there are no compelling reasons for thinking that California prairies would have burned differently.

Clearly, fire was an important component in both the cultural and ecological systems of the prehistoric Willamette Valley. The Kalapuya Indians used fire in a wide range of subsistence activities, and fire was essential for

maintaining a fire climax biotype. The link between the two systems was the natives' use of fire as a tool, a tool which simultaneously improved the subsistence quest while maintaining ecological diversity. With control over and knowledge of the ecosystemic effects of fire, the Indians established an important symbiotic relationship with their environment. Put in other words, the Kalapuya, like other North American Indians, became an environmentally selective force, acting through their agent, fire.

NOTES

1. This paper was originally prepared for a reading and conference class with Dr. Wayne Suttles at Portland State University, in the fall of 1976. An abbreviated version was read at the Second Annual Public Archaeology Conference (sponsored by Archaeological Associates Northwest) at the Oregon Museum of Science and Industry in Portland, on January 15, 1977. Later drafts of this paper have benefitted from the comments and suggestions of Pamela Amoss, Donald Grayson, Eugene Hunn, Brien Meilleur, Helen Norton and Henry Zenk.
2. An interesting sidelight to this history is that prescribed burning, after a hiatus of over a century, has re-emerged as an important tool of environmental manipulation in the Willamette Valley. In the decade following the Second World War, an important grass seed industry became established in the south and central valley counties of Lane, Linn, and Marion. Seed growers discovered that annual fall burning was an excellent technique for removing litter and destroying various grass pathogens. Unfortunately, however, the practise of large-scale burning produces a great deal of smoke, which becomes trapped in the upper Willamette basin around the city of Eugene. Because of the pollution problem, field-burning is now restricted by legislative decree (Svart 1970).
3. After the "fever and ague" epidemic of the early 1830s there was a significant influx of equestrian Sahaptin Klickitats from the Columbia Plateau into the Willamette Valley. These people were forcibly removed to their former homes in the early 1850s, and their descendants reside on the Yakima Reservation.
4. The relevant passage from Zenk is: "There is evidence that Willamette Falls presented an insurmountable obstruction to migratory fish during seasonal low-flow conditions. The spring chinook run, which ascended the falls during high water in the spring, was probably the only significant salmon run in the Willamette drainage in aboriginal times. Moreover, spring chinook ran only in the larger tributaries heading in the Cascades (notably in the North and South Santiam, McKenzie, and Middle Fork tributaries), and apparently were non-existent in the smaller and warmer western tributaries such as the Tualatin and Yamhill Rivers" (1976:69-70).
An interesting, but unproven possibility, suggested in the following passage in Hewes (1947:17) is that, in the lower-gradient tributaries of the western valley, aboriginal burning may have caused erosion and consequent silting of the rivers to the extent that they could not meet the requirements of water clarity and oxygenation necessary for successful salmon spawning: "While the cultivation of crops is the major cause of indirect depletion, fires set for hunting drives, or for clearings in which wild grasses or other plants may be encouraged to grow are sometimes locally effective agents in the alteration of aquatic environments." If true, this would indicate an interesting, but certainly unconscious, trade-off on the part of the Kalapuya Indians - promoting an increased prairie plant resource to the detriment of the existence of an anadromous fish resource. The modern analogy of aboriginal burning causing siltification and preventing establishment of salmon runs, is, of course agriculture.
5. "Shoshone" was a common contemporary designation for any Indian of a generalized inland cultural type, regardless of ethnic affiliation. Astorian Robert Stuart, speaking of a spring 1812 exploration of the Willamette Valley, described this type as follows: "along the [Willamette] river as far as Mr McKenzie went natives are very numerous, and go by the name of Shoshonas they have neither Horses nor canoes . . . their clothing is principally Beaver and Deer skins, they have no villages or stationary habitations, but live in temporary huts along the river banks" (Stuart 1935:33).
6. Missionary Samuel Parker, who visited Oregon in 1836, gives two similar figures for the Kalapuya: 7785 (in his 1835-37 "Report of an Exploring Tour", page 123), and 8870 (in his 1838 *Journal*, page 264). Both figures were unrealistic for the period after 1831 (as noted by Daniel Lee 1944:100). But a close reading of both texts shows that Parker's numbers were for an earlier date (at least "five years" prior). They were obtained from officials of the Hudson's Bay Company, who, in later years at least, kept detailed records of Indian populations in their territories. A second source which implies a larger aboriginal

- Kalapuya population figure is William Slacum's 1936 statement that losses to disease in the valley in the early 1830's numbered "not less than 5,000 to 6,000 souls" (Slacum 1912:201).
7. A microfilm copy of that portion of the Eld journal covering the overland journey is available at the Oregon State Library in Salem. Through the courtesy of Archibald Hanna at the Beinecke Library, the author of this paper has been provided with a microfilm copy of volume three of the Emmons journal.
 8. The Peale diary is incomplete: that portion covering the Willamette Valley was lost on the expedition during an upset while crossing the south fork of the Umpqua River. A sixth journal of the overland trek was apparently kept by the official artist of the expedition, Alfred Agate. Charles Pickering's *Races of Man* (1848:39) refers to such a manuscript, in addition to reproducing two of Agate's watercolors of Kalapuya Indians. I do not know the whereabouts of the Agate journal if, indeed, it still exists.
 9. Recent linguistic analysis of "Cow Creek Umpqua" terms in Riddle (1920) indicate that these people spoke the Takelma language, not Umpqua Athapaskan (Zenk 1985 p.c.).
 10. The sugar pine (or lambert), here at its northern limit, was the tree that David Douglas had been searching for in his 1825 expedition to the Umpqua, hoping to take back its seeds to Kew Herbarium in London, where it might be experimentally grown. (For Douglas' description of the sugar pine see his *Journal*, page 213).
 11. Applegate's account, though certainly based on fact, is suspiciously similar in style to a passage in Washington Irving's *Adventures of Captain Bonneville* (1977:245-246), describing burning of prairies by Cayuse Indians in the valley of the Grande Ronde in eastern Oregon. Applegate was a popular writer, who modified and retold various boyhood experiences from the pioneer period of the 1840s in such a way as to make them more salable to the reading public of turn-of-the-century Oregon.
 12. There are, of course, different ways to go about reconstructing the role of anthropogenic fire in now extinct cultural and ecological systems. One can begin with a surviving ecological pattern, as Lewis (in *Patterns of Indian Burning in California*, 1973) has done, and fit the ethnohistoric and ethnographic data into this pre-existing framework, or one can begin with the ethnohistoric data, as I will do, and place it into a subsistence and ecosystem context. It might be argued that the "reasons" given by early white observers are ethnocentric, representing the outsider's view of the inner workings of the Kalapuya culture. In the Willamette Valley, however, both the pre-contact cultural and ecological systems of fire are extinct. We must use what evidence remains. What is important is how these "reasons" provide clues about and tie in with what surviving evidence we have on Kalapuya and similar hunter-gatherer subsistence strategies, and how they "fit" with what is known about the interaction of fire in other grassland ecosystems and its effect on their constituent species.
 13. Not to be confused with John Hudson, Jacobs' main informant for his *Santiam Kalapuya Texts* (1945), who died in 1954. Joseph Hudson was of an entirely different generation. His relationship to John Hudson is not known. Henry Zenk has supplied me with the following information on Joseph Hudson. Under the name of "Al-qe-ma" or "Yelkma", he was a signer of both the Dorn (1851) and Palmer (1855) treaties. He was sketched by George Gibbs around 1850 (Bushnell 1938 plate 7). Under the name of "Jo Hutchins," he is cited in at least two published works on the Grande Ronde reserve from the 1870s.
 14. Quinaby was another well-known native of the early reservation period. See "Twilight of a Chief" by Oswald West in *The Oregonian* 10/22, 1950, magazine p.12 for a popularized account of him in the late 1880s.
 15. A second description of a communal autumn deer drive, without fire, is the following from the 1853 Pacific Railroad Explorations (Donelson 1854: "10/14 The Coeur d'Alenes, Pend d'Oreilles, Spokanes and Nez Perces meet together to fish and hunt. They have an ingenious way of hunting the deer, which is worth relating. A large circle is enclosed, and upon the trees around its circumference are attached pieces of cloth. Then the hunters enter the area and start up the deer. The deer are afraid to pass the cloth, and are easily killed. Last year the Pend d'Oreilles, in one hunt, killed 800; the Coeur d'Alenes more than 400." Parenthetically, it might be noted that an added advantage of using fire in such contexts is that smoke acts as both a screen and eliminates the scent of hunters.
 16. The communal fire-drive was supplemented by another communal method using brush or rope fences throughout much of the Plateau-Valley-California Province. The Shasta had this method, for instance (Dixon 1907:431), as did the Takelma (Sapir 1907:260; Riddle 1920:43); and the Umpqua (Riddle 1920:43) in the valleys to the north.
 17. Another seed known to have been collected by the Kalapuya came from sundry species of *Balsamorhiza*, the Western "sunflower." Other than the requisite burning in the case of tarweed, the gathering and preparation of sunflower and tarweed seeds was similar. Both were knocked off the plant with a beater into a small basket or bucket and then transferred to a larger soft burden basket on the back (M. Jacobs 1945:37; Sapir 1907:259). The sunflower seeds were then parched and ground into a paste. This similarity in collection may partially account for the frequent confusion of the two varieties in the early accounts (e.g., Wilkes 1849; and Emmons 1841 page 72, above). A second significant difference was in the time of harvest. *Balsamorhiza* seeds were ripe in July; tarweed in September. The common eastern sunflower, *Helianthus annuus*, which also ripens in September, was not native to the Willamette Valley. (See Zenk 1976:23 for a discussion of this identification problem).
 18. Six species of *Madia* are native to Western Oregon, according to Hitchcock (1955(5):261). *Madia gracilis* and *exigua* were first reported from the West Coast by Vancouver's lieutenant, Archibald Menzies, in 1792. *Madia elegans* was first listed by David Douglas in 1825. Thomas Nuttall recorded the remainder, *M. glomerata*, *mad-iodes*, and *sativa* (though usually under obsolete scientific names) in 1834. *Madia sativa*, the species domesticated by the Chilean Indians, was collected on Sauvie Island, next to Fort Vancouver. Of its unusual distribution, Hitchcock says: "The peculiar disruption of the range of this species has been thought by some to be a result of a chance introduction either in Chile or in California, but other species with similar distribution patterns are known" (page 264).
 19. Parenthetically, although it is not recorded for the Kalapuya, we might mention here the practise, reported from the Central Valley of California by Kroeber (1939:4) of burning a species of grass to obtain salt. The species in question is salt-grass, *Distichlis spicata*, also found in the Willamette Valley.
 20. As this paper was going to press, Henry Zenk informed me that in recent years Grand Ronde reservation basket-makers used hazel-shoots from burned-over areas, which suggests this was an aboriginal Kalapuya practice as well.
 21. It might be noted that most early white contact with unacculturated Kalapuya took place during the spring and summer months, when trapping expeditions were undertaken and when the natives were dispersed over the land.

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1985 personal communication.

Dear Mr. Warner:

Enclosed is a copy of "Strategies of Indian Burning..."

Unfortunately, CJA didn't send me galley proofs and there are some typos, which I've corrected in this copy. Some refer to your area—and the last minute communication that the Cow Creek spoke a Takelman, not Athapascan language.

Hope you find the article useful.



Robert Boyd

ERRATA SHEET

p.68: map title should read Linguistic Distribution...Linguistic boundaries

p.70 Add the following:

> Similar entries to the above for October 2nd follow in Douglas' journal: on the 5th the expedition again camped alongside a "woody stream" where there was fodder for the horses; on the 6th Douglas again reports "my feet are very sore from the burned stumps of the low brushwood and strong grasses" (1953: 217).

> McLeod's journal from a subsequent 1828 trapping expedition has also been preserved. By this date, the annual burning of the prairies was a well-known phenomenon that the Hudson's Bay trappers considered an impediment to easy travel through the valley. In a letter to the company factor Dr. John McLoughlin at Fort Vancouver, dated September 8, 1828, McLeod complained:

p.72, column 2, line 10 of main text should read
...In Cow Creek Umpqua territory...

p.74, column 1, following "Reasons for Burning" add subtitle
"The Circle Deer Hunt"

p.75, column 2, under Tarweed, delete references to Umpqua
(quotes are for Kalapuyan and Takelman speakers only).

p.83

fn 13 substitute "Joseph Hudson was John Hudson's father's brother."
for sentences 2 & 3.

fn 16 delete reference to Umpqua.

The Native Environment: Contemporary Perspectives of Southwestern Oregon's Native Americans

by Kenneth Liberman

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At the dedication ceremony of a new county park named after a chief of the Cow Creek Indian band of the Umpqua district in southern Oregon, the senior senator from Oregon, Mark Hatfield, spoke of the indebtedness of all Oregonians to the Native American people, who had looked after the land so well. Senator Hatfield suggested that the time had come to learn from those people who knew how to "use the land and yet live in harmony with it." His counsel was that living in a balance with nature was a cultural feat which contemporary Oregonians must learn to achieve.

What is such a "balance", and by what tokens is it recognized? Sociologists know well that there are many varieties of balance, as varying kinds of equilibrium between society and nature are reached by the dialectical products of human social evolution. The balance struck by southern Oregon's Native Americans, of which Senator Hatfield spoke, is to be sure only one possibility; their environment is only one among many potential environments. But since their praxis of environmental understanding-in-use was a successful one, the suggestion that there is something to be learned from them must be taken seriously. In order to acquire some understanding of their ethnoenvironmental praxis, I spent a summer interviewing members of southwestern Oregon's Native American tribes about their knowledge of the southern Oregon environment and soliciting their opinions of the changes that had taken place in the region during their lifetime. One possible way of securing moorage from which to judge how in—or out-of-balance with the environment contemporary American society has become may be to witness that environment from the perspectives of these people who have never dwelled anywhere else.

Thirty Native American people were interviewed in depth from all of the major tribes of southwestern Oregon. These tribes may be characterized as being largely assimilated into Anglo-American society, but they still maintain an active contemporary Native American culture. Most tribal members were from one-quarter to one-half Native American, were employed in contemporary occupations, and lived in urban, suburban or rural areas and not on reservations. Members of two tribes outside southwestern Oregon (Klamath and Karuk, in many ways more traditional) were interviewed when they had established residence for some time in one of the southwestern Oregon counties of Coos, Curry, Douglas, Jackson and Josephine, the area to which this study was limited. In order to provide some context for this study, the

current populations of the tribes concerned, and the number each that was interviewed, are provided in Table 1. (See Table 1)

Historical Background

Southwestern Oregon's Native Americans fared poorly in the wake of the European settlement of the area. War decimated many of the tribes, particularly the Rogue River Indians, whose few descendants no longer live in the five county area. Poisoning, most generally the application of strychnine to sacks of flour left out for the Indians' use, took a heavy toll as well. Those Native Americans who survived were removed from their traditional homeland to supervise reservations in the north of the state. As one Chetco² leader summarized the treatment of southwestern Oregon's Native Americans, they were "totally uprooted and removed, burned and destroyed."

The result of official policies toward these Native Americans is that their links with their traditional homeland were severed almost entirely. The Chetco, Coos, and Coquille tribes were removed to the Siletz Reservation, along Oregon's northern coast, where they were forced to mix with 43 Indian tribes. The Cow Creek (Upper Umpqua)³ were removed to the Grand Ronde Reservation, west of Salem. Today, with few exceptions, there is little linguistic or cultural continuity between the Native American life at the time of European settlement and the Native Americans today, and this is viewed as a tragedy by contemporary Native Americans.

The few exceptions involve three categories of persons. First, Native American women who had married whites were permitted to remain in the five county district. This accounted for the survival of the Karuk in the Rogue River area, who were brought in from northern California as wives of the first Europeans to settle the Rogue after the indigenous population had been wiped out. Such Indian wives were among the most easily acculturated Native Americans, not the preferable repository of indigenous culture. The second group of Native Americans not to be uprooted were a small number of people who had succeeded in escaping removal or who fled the reservation and trekked back on foot to their tribal homeland. One informant's great-great grandmother was hidden from authorities by a white family, who placed her in their flour barrel. Another informant's great grandmother escaped the Siletz Reservation by swimming all of the rivers from Yachats to Coos Bay. The third exception was a group of Cow Creek

who managed to hide permanently in the hills of the South Umpqua drainage and were never located by authorities. To a great degree, these exceptions provided the basis for Native American culture in southwestern Oregon today.

All young Indians were sent away to schools where their native language was forbidden and where their identity could be remade, far from the place of their birth. Short hair and a military-like regimen was the rule, and Indian dress, languages and customs were prohibited. Upon returning to their home districts, near the end of the last century, white policy was to make farmers of the young Indians; however, most Native American tribes in Oregon had lived a semi-nomadic hunting and gathering lifestyle, and the efforts to make the Native Americans into an agrarian people was neither successful nor appreciated. The result of these policies is that while the

new generations of Native Americans in the region were no longer traditional, neither were they European. Their tribal culture, which was transmitted orally in stories and myth, was eradicated, with only fragments remaining in a few remembered stories or in anthropologists' notebooks. Today, the descendants of these Native Americans seek to make contact with their heritage by reading ethnographic accounts of their ancestors.

Native American Identity Today

What traditional knowledge remained was not pursued by young Native Americans growing up in the early part of this century. Informants reported that the generation of Native Americans now aged 50-70, and their parents, were made to feel ashamed of their Indian heritage. As a middle-aged Chetco from Brookings explained it, "There was a period of time when there was some white-washing—our parents' generation and their mother's generation. During this period they were saying you are no longer Indians." A Cow Creek lady in her mid-50's reported, "I didn't care to admit that I was an Indian." A Coos man in his mid-60's told me that as a child he identified with the cowboys, so pervasive was the dominant cultural patterning, "I wouldn't have anything to do with that side of the family." In recent years this person and other Native Americans have begun to express their Indian identity.

With the decreasing hegemony of the Anglo role model which occurred during the 1960s and with the increasingly multi-cultural character of American society, along with increasing civil protection of cultural minorities, southwestern Oregon's Native Americans have begun to dare to identify with their heritage. A 71-year-old Coos/Karuk man explained that while his father had seen himself as half-white, he viewed himself as half-Indian. And a 60 year old Coquille Indian informed me, "The older I get, the less like white people I become."

Personal identity is to a great degree a social product. That a

Native American who is genetically only one-quarter Indian can identify more strongly with his Native American heritage than a person who is five-sixteenths or one-half Native American demonstrates the importance of cognitive factors in

such self-identification. What remains to be explained is why a person with one-quarter genetic heritage would prefer the values and the identity of a people who have been so thoroughly subjugated for so long. Some Anglo-Americans are surprised to find that this is the case, and offer the cynical solution that Native Americans are doing so in order to receive government welfare, educational or other "hand outs" available for them. The correct answer to such self-identification with the Native American heritage lies in some important ethical and philosophical decisions on the part of the persons concerned, for in many respects the value-systems of Native and Anglo-American groups remain very

different; possibly, Native American values, especially those affiliated with their view of the environment, are the most enduring cultural feature of the southwestern Oregon Native American communities.

Wanting to identify with one's Native American heritage amidst a near-absence of traditional cultural expressions presents unique problems. Some young Native Americans have begun to identify with what has become a "nationalized" Indian identity, an amalgam of practices that include Plains Indian drumming and Navajo jewelry. The advent of the "pow-wow", unknown in pre-contact southern Oregon, is typical of this phenomenon. Leaders of southwestern Oregon's tribes are critical of what they term "culture peddlers" who are importing Native American traditions not indigenous to Oregon. "We need to keep within our own tribal structure," is the complaint; however, what this traditional structure was is not altogether known. A young Cow Creek, who identifies strongly with his Indian heritage, remarked, "When somebody says we're going to do it the traditional way, you have to laugh at them." While he may not be certain regarding what the proper traditions were, he is fairly certain of what they are not. Further, in most areas young members of the tribes are sent to Indian camps, in order to learn something of their traditions. The program of instruction at such camps include some transmission of botanical information, occasionally from a book, learning how to build tipis (tipis are not indigenous to southwestern Oregon), Christian prayers, and other information taught by tribal elders, non-Oregonian Native Americans and non-Indians alike.

It is important to note that it is by no means easy to convince tribal elders to pass the knowledge that they do retain to the next generation. In the first place, such knowledge is considered a valuable personal possession, and its scarcity is the grounds for the status it offers. Second, education in Native American societies (as in other cultures, e.g., the Japanese) is not a matter of verbose formal instruction but a more quiet

Table 1		
Profile of Native American Population Studied		
Tribe Population	Number Interviewed	Total
Chetco	2	200*
Coos	9	338
Coquille	6	250*
Cow Creek	6	350
Karuk	4	100#
Klamath	3	150#
Total	30	approx. 1,400
* approximate number, based on B.I.A. estimate		
# estimation of population in five county area only		

process of learning how to observe, what to observe, and how to know when you have been clued or when something important is being pointed out, etc.⁴ One Native American complained of his cousin who had not been passing along traditional knowledge to his adult son, but the cousin responded by saying that his son needed to learn it for himself. Third, contemporary elders do not always trust their highly acculturated offspring: "I don't even tell my kids because they're at the age when they might blab. So I'll wait until they grow up." By the time they grow up, many of the elders will have passed away. There is an almost universal regret among the people I interviewed regarding their failure to learn the full store of what their grandparents had to offer them, and this pattern continues today. Another informant won't tell her daughter of 50 years where two burial sites are located, and yet another has an aunt who knows a great deal about sacred places and vision quest sites but keeps her knowledge to herself.

Not all contemporary Native Americans wish to identify with their heritage. A few persons are emphatic about their lack of interest, and conflicts about this occur within families. Some truly view themselves as whites; others feel threatened by the possibility of losing their rights to self identification as an Anglo-American. One part-Native American accused another full-blooded Native American of trying to perpetuate a "beads and feathers" mentality against the practical reality of an Anglo-American world. Identity is a social construction, in part self-produced and in part the response to being an object for another's perception. Given the history of forced assimilation, racial miscegenation, and the strategies involved in surviving in a racist social environment, it is understandable that one might not choose to identify with his or her Indian heritage. But what of those who persist in constructing, and reconstructing, their Native American identity? What differences exist between Anglo-Americans and Native Americans that are sufficiently worthy to become grounds for choosing to identify with the latter rather than the former?

Some Differences Between Anglo- and Native Americans

The most prominent characteristic of Native American life is that most Native Americans feel themselves to exist in close association with their surrounding environment, especially to particular place locations. Sacred places, rivers, mountains, etc. have frequently served as the center of tribal identity for Native Americans throughout the western United States. Native Americans in southwestern Oregon have preserved some intimate relationships with particular food-gathering locations, many of which have also served as tribal meeting grounds. The Chetco make a spring salmonberry run to areas where their parents and grandparents gathered berries. Cow Creeks make a fall pilgrimage to gather fruit at the huckleberry patch. Favored sites for collecting hazel nuts or other edible species have been passed down in most tribes. The Coos and Coquille have their traditionally favored sites for mussel and clam collecting. And there are also sacred places, to which some of the tribal members return each year, which my informants were reluctant to discuss.

The southwestern Oregon Native Americans have a custodial relationship with the environment. "We grew up respecting the environment," I was told, and this was contrasted with the behavior of most whites who "don't respect nature." Anglo-Americans were described as beating down berries, mashing them underfoot, as they struggled to reach

other berries; by contrast, Native Americans described themselves as being concerned to put their feet down in between berry-laden branches. "as we were taught". White youths who drive their off-road vehicles down the middle of the sloping South Umpqua Falls, a sacred place, are held in low esteem. Generally, whites are not viewed to be in harmony with the southern Oregon environment to the extent that Native Americans are. One informant described how the Bureau of Land Management (BLM) issues shit-bags to the logging truckers, a practice which struck the informant as peculiar. One 50 year old informant told me, "If I come to a dozen streams, I'll probably drink out of every one," whereas a white person would be reluctant to drink from most waterways. An 83-year-old lady announced proudly, "There's hardly a thing around here I haven't tasted," and another informant reported that he knew each and every rock in Douglas, Jackson and Josephine county.

Southwestern Oregon's Native Americans move in a different geographic universe. Their cognitive map is marked with food collection sites, meeting places, burial grounds, sacred sites, etc. Old cedar posts marking the separation of the Coos lands and the Coquille lands are as much in the minds of these people as county boundaries. Old shelters, native trails and the remnants of fish traps are geographical landmarks which populate their world. One informant explained that when Anglo-Americans gaze out at the forest they see "greenery", whereas Native Americans see the details - berries ripening, the level of the river, an old patch of berries that has gone, the mark of an elk that has rubbed his antlers on a tree, etc. "A White doesn't see the beauty that an Indian does."

In the perception of so much detail lies much of what is unique about contemporary Native Americans. This *detail* consists of such phenomena as keeping track of specific herds of deer and elk, and specific members of these herds; attending to the growth and decline of species such as the number of pairs of stellar sea lions in Coos Bay harbor, compared with decades ago; noting the temperature variances among rivers; knowing the color and taste of salmon by watershed; and observing the presence or absence of fur on the tails of rats. One Coos Indian told me, "How many have seen the fir tree bloom red? It's a pretty blossom, but the [white] people just can't see it."

One Native American said that perception of such detail of the natural environment was the one thing that white people were not able to take away from the Indian, and a certain "feeling for the lay of the land" is highly treasured, even by the later generation of Native Americans. During the course of my inquiries I was lectured by many informants. A Cow Creek informant told me, "I was trained to be oriented," and he delivered a short discourse on how one doesn't really know a mountain by just seeing it from one side - one must know it from the back side as well; further, one needs to witness each principal peak from the vantage point of all the other peaks before considering oneself properly oriented. As important as these object differences between Anglo-Americans and Native Americans are, spiritual or philosophical differences may be even more significant. Here the issue of "harmony" is salient. In the view of Native Americans, Anglo-Americans believe that they must dominate the environment, ever "conquering" and transforming it. It is by effecting change in an environment that Anglo-Americans express their mastery over nature, a mastery which could not be demonstrated in the absence of such change:

Whites show up to a river, and they have to put a dam on it

They can't leave anything alone. It doesn't matter what it is, they've got to change it. Every time they show up, they have to change it. Why don't they just watch?...Coos. They say to us, "But those Indians don't use that land." Why in the hell do we have to use it? People think that if they don't use the land, it's not doing any good....Coos. Most whites see themselves as being in competition with nature. Most Indians see nature as cooperating with them. Indians seek to find their proper place....Coquille.

In seeking to dominate nature, Anglo-Americans are seen to demonstrate their lack of respect for nature. Informants from all areas questioned why white people felt obliged to improve upon every natural feature. A hole was blasted in South Umpqua Falls, a sacred place, in order to provide more deep water to give the salmon negotiating the falls more of a running jump. Medicine Rock on the Oregon coast, also a sacred site, was blasted in order to make a jetty. Whatever the location, engineering is necessary.

A Coquille Indian in his 60s offered some articulate criticism of President Reagan's public statement that his objective was to "get back to what made America great." According to this informant, "What made America great was Indian land and Indian resources. And these resources have been exploited to death, and they're not there any more. The

Americans is the difference in the temporal perspective of their thinking about the natural environment. "Most of my people think in the long-term," remarked one Coos man. And an elderly Karuk man cited the difference in time perspective as essential; by comparison, Anglo-Americans are considered to construe the effects of their environmental practice in the short term. "A white man comes in and takes everything he can take out for a quick profit, and then walks out and leaves it because there is nothing left." Native Americans think that whites need to pay more attention to the future. Although one elderly Karuk man believes that whites are coming to the point where they are beginning to think of the long-term, an elderly Coos man queries, "Even if they do start to plan for the future, what will be left by the time they do it?"

Philosophical Orientations of Native Americans

Native Americans of southwestern Oregon are not opposed to that natural resource utilization that can be sustained indefinitely without damage to the environment. This is in conformity with the spiritual responsibility they feel to keep and preserve the natural environment, just as that environment keeps and preserves them. If it is a spiritual notion it is also

Table 2

	Favors Environmentalists	Opposes Environmentalists
Urban Native Americans	5	2
Rural Native Americans	1	4

only solution is to change our entire socioeconomic system. You've got to 'get back' to something that is renewable, like fish, not like oil." In the view of this person, a further dose of "what made America great" would only run up against the absence of resources that have already been consumed; consumption of this kind is not a viable long-term land use strategy.

Much of the difference lies in the Anglo-American perception that nature can be possessed, in contrast with the Native American perception that humanity is only one component of a "balance". Another Coquille summarized the difference between Native Americans and Anglo-Americans as the difference between utilization and exploitation. The Native Americans were all in favor of utilization.

The Anglo-Saxon notion of ownership has not taken root among Native Americans. They continue to look after sacred sites and burial grounds that are on private property, and they are offended to find "No Trespassing" or "Keep Out" signs, especially in long-utilized food gathering areas; and they generally decline to use such signs on their own property. A young and highly respected Coquille man announced, "I'm not a real redneck on land use, as far as the idea that if I own land I can do what I want with it," and a Chetco lady complained, "You can't say this is mine, mine, mine. You have to live with the environment." And "People think we own everything and have control over everything, but we really don't have a lot of control over anything...You don't really own the land." Custodianship, then, is not ownership.

A final difference between Native Americans and Anglo-

seen as a practical one. The term "keep" recurred across several informants from the different tribes and captures best the notion of balance Native Americans feel. A Chetco Indian said, "Mother always told us to live in balance. Never over-pick an area because you have to come back to it and that's what keeps you." A Cow Creek elder in his late 80s explained, "If they learn to keep game, there'll be plenty of game for everybody." A younger Cow Creek told me, "Never pick the last berry; you have to leave something to carry on. We are taught never to take the last of anything; you've got to keep something to keep things going." And a Coos Indian stated, "If you don't protect the earth; it's not going to help you in any way," just as a Cow Creek said that his people "believe in using land, but not abusing it."

The dictum that one should never take the last berry was repeated many times, as though it contained the pith of the Native Americans' environmental praxis. One elderly Karuk would not provide me with any ethnobotanical information because he feared that Anglo-Americans would go out and pick the entire herb without leaving anything to regenerate. "Balance," for these people, includes reciprocity, both give and take. A young Coos informed me, "Don't take something without trying to replenish it," and a Chetco added, "We need to preserve the environment and keep it natural, because we learn from it." Summarizing her native education, a Klamath lady reported, "The number one rule of child-rearing is, 'Respect nature.'"

Part of this respect involves the belief that animals have rights and that plants have rights. As one Coos told me, "Each

thing has a spirit of its very own. And this gives you a whole different feeling." Such heightened respect for the rights of animals and plants decenters human beings, placing humans in the periphery along with other life forms instead of at the center as in the more anthropocentric cosmology of Judeo-Christian civilization. As a Coos man in his 60's said, "The Indians see themselves more as short-term users, not conquerors. The Indians have no more rights than the deer or the bear."

An elderly Karuk man who had fought fires for many years told me that during one fire he saw the deer run out of the forest, cross the creek, and take refuge on the other side. The fire hopped to the opposite ridge, and the U.S. Forest Service wanted to backburn at the base of the creek. He opposed this, telling them that it's all going to burn anyway, but the way they were doing it, they'd kill all of the deer unnecessarily. This instinctive concern for wildlife is typical.

Most of these Native Americans consider themselves Christians; however, their interpretation of Christianity is much more in line with traditional animistic beliefs than one might expect. A Chetco: "God is the moon, the stars, the sun, the trees, the water, the animals. It's the wind. Stop and listen." A Cow Creek: "Indians believed in the great father spirit and the earth mother...I go out in the hills and pray, but I might not say a word." Certainly, there is no adherence to a sharp distinction between humans and nature, as exists in Judeo-Christian theology.

The traditional religious life of most southwestern Oregon's Indians did not involve as much collective ritual as it was a more solitary, personal affair, modeled after the vision quest of the shaman; and this motif inspires Native Americans today. One informant told me proudly of his grandmother who would go out into the hills without a gun and return happily a month later without a mark on her clothes. As the chairperson of the Cow Creek Tribe explained it: "The religion of our people was a silent, private communion. Early in the pre-dawn hours one communes with nature. Or maybe a person would go out for several days—to look for a message that would sort out their lives. It's not getting together and beating drums."

Attitudes Towards Environmental Issues

Many of the Native American positions regarding land use management in southwestern Oregon are derived from their philosophical perspective, which must be considered to be based upon a traditional value system. If these people are environmentalists, they are not opposed to resource utilization. If one were to compress their logic into a sentence, one would say that they would support any resource utilization that can be kept and maintained in perpetuity.

Nearly all of the Native Americans interviewed supported the cutting of 'old growth' in the forests. This was a major political issue, as during the summer of these interviews members of the environmental activist group Earth First! had been protesting the cutting of some of the last stands of old growth timber in the Siskiyou National Forest by climbing trees slated for logging and living in them for many days. In the view of most of my informants, "keeping" the forest did not necessitate protecting old and decaying trees: "I don't see anything wrong with harvesting old growth timber, because it's on its way out anyway." ...Coos. "Fir timber, like anything else, gets ripe, and then it gets overripe. It becomes brittle and starts rotting. The top starts to dry, and then break off when the winds blow." ...Coos. "The old growth is going to fall over anyway. In the old days they wouldn't have to cut it because

they would have considered it too rotten." ...Karuk. "There's much now that's overripe, they should cut it...They can't anything with it when it's overripe." ...Karuk.

Even Native Americans who were strongly critical of logging practices supported cutting the old growth. In words of one Coquille Indian, "You can't stop all the cutting. There are two extremes: cutting every tree and cutting none of them." Although most were glad that there were environmentalists keeping an eye on forestry practices which degrade the environment, they also felt that environmentalism is occasionally impractical: "Sometimes environmentalists go overboard; sometimes they're nice and have around...." Cow Creek. "Most environmentalists don't know the first thing about forestry..." Coquille. "Before they commit themselves, they should be getting the opinion of someone that knows..." Coos.

Several informants who consider themselves environmentalists went so far as to claim that if they were loggers involved with protesters, they would cut down the tree, anyway. A Cow Creek informant who was sharply critical of President Reagan asserted, "The Earth First! group I hate their guts. If it was me and he was in the tree, I'd fell the tree." A Karuk elder said, "If I had a logging job, I'd not worry about them." The Coquille elder who was critical of Reagan's "what made America great" philosophy (cf. above) criticized the Earth First! protesters for giving environmentalism a bad name. He viewed them as just another urban group that knew nothing about the local environment: "The Earth First! people are a bunch of nuts. They're not really environmentalists. They don't know the first thing about Douglas fir forests, or about logging practices."

While most Native Americans supported some aspects of environmental activism and opposed others, those few who had strong views for or against environmentalists could be divided along the lines of living in a rural or urban setting, with urban-dwelling Native Americans being more inclined to favor environmentalists. Table 2 summarizes those who have explicit opinions: (See Table 2)

Similarly, most Coos and Coquille Native Americans, dwelling in the bay and coastal districts in Coos County were opposed to the prohibition against killing seals and sea lions, and this was in line with their belief that the environment had become out of balance because of the protection afforded by the Marine Mammal Protection Act. While they accepted the fact that such protection may be necessary in the northeast United States and in Hawaii, in western Oregon populations of seals and sea lions had grown five-fold over the number any had witnessed during their lifetime. Ninety per cent of the steelhead run in Alsea was taken by harbor seals, and the seals in the estuaries eat a good deal of the crab bait. They will even eat the fish right off the hooks, I was told. The dredge spoils islands near Empire in Coos Bay which provides the seals with an ideal habitat, and they are proliferating rapidly. This increase in population is helping to attract killer whales and great white sharks to the coastline.

The environmentalism of southwestern Oregon's Native Americans is one which originates from their own worldview; while there are a number of areas where their viewpoints coincide with that of non-Indian environmental groups, the rationale and values underlying their perspectives are uniquely Indian. The strongest views of Native Americans were about the damage to rivers, fish, and wildlife, and their opinions derive from their long association with the natural environment of their various districts.

The almost universal complaint was that the rivers of southern Oregon have been destroyed. One 71-year-old Indian described the deterioration of the Rogue River, an officially designated Wild and Scenic River: "I don't want to look at it any more. It's not my river. I'm mad about that." He described its color as "black", and reported that it had never been that color before. Other informants reported massive algae blooms in the rivers, something they never witnessed when they were children. A Coos Indian told me, "The Indians get to thinking about what they were raised like, and they just can't buy this destruction of the rivers." They place the blame for this degradation of watershed on four practices: clear-cutting of forests, agricultural irrigation, the grazing of cattle, and dams.

The principal cause of river water quality deterioration was thought to be the clear-cutting practices. This muddies up the rivers, destroys many of the side streams altogether, and reduces the watershed. I was told that one effect of clear-cutting in the higher elevations is that the snow, left out in the open, will melt faster and disappear earlier in the season. When big timber shades the snow packs, they are preserved longer and water quality can be maintained throughout the season.

Second to clear-cutting, the intensive withdrawals of water up river for agricultural use further reduces the flow of water. The opinion was voiced frequently that farmers need to use more sense with irrigation. "Some of them turn the whole streams into the fields, fish and all." "Ranchers pump out of the river 24 hours a day. It was a beautiful river; now it's all moss." Also, chemical fertilization and pesticides are leaching into the watershed, affecting the water quality.

An important consequence of the deterioration of the rivers is a reduction of the quantity of fish. Both agricultural and industrial pollution are believed to be poisoning fish. As one 83-year-old Karuk put it, "The fish never used to go belly up." A Coos man complains that no trout are left in the rivers, and a Klamath lady says that the only fish left are "sucker fish". While some of the blame for this was placed on the dams, a Cow Creek proposed the greater numbers of fishermen as a reason. A Coquille man disagreed: "Every riffle in the fall would be full of salmon forty years ago, and every little stream up and down the coast would be just the same. If you tell marine biologists this these days, they won't believe you. They aren't there now, and that's progress. It's not the number of fish caught that is depleting them—the Indians were catching more than are being caught today, and there was still a great surplus." Some of the people interviewed noted that the salmon runs have increased recently, due to an aggressive hatch-box program. One informant diligently feeds the private hatcheries with a supply of fish food supplied him by the state; however, he also complained that the state is closing down some of the hatcheries instead of replenishing them.

The story was similar for marine and shell fish. A Coquille man reported that flounder was abundant in Coos Bay when he was a child, but he hasn't caught one in years. Areas where Coos and Coquilles collected clams for generations have been overharvested, and strong objections to the use of suction hoses were voiced. Also, commercial fisherman were considered to waste fish: "They only want filets". Similarly, Coos and Coquilles are angered by crab fisherman who take females and also crabs with soft shells; "Now they take anything." Much of the criticism is directed to the state fish committees, who permit the extension of crab season and who "don't know one end of the fish from the other." But criticism is also addressed to the city of Coos Bay, which according to

one of my informants permits itself a convenient sewage spill each winter, making clam collecting unsafe. Even more seriously, most of the oysters in Coos Bay have a disease, which causes them to grow quickly without any meat. The disease is caused by a shipyard paint ingredient that deters the growth of barnacles on ships; on several occasions this chemical has polluted the bay, compelling local authorities to ban the collection of oysters. Additional pollution in Coos Bay was traced by informants to Weyerhaeuser's operations. Near the North Spit, a traditional Coos meeting ground, Weyerhaeuser's operations produce a toxic black effluent that takes six to eight years to break down. According to an informant, this is dumped in the sand dunes north of Weyerhaeuser's operations or given away as "free dirt", spreading the pollution throughout the county (including a creek named after the family of my informant). Swans, geese, ducks, etc. used to abound in the area of Weyerhaeuser's North Spit plant but are now few in number.

Declining wildlife population is also the rule. Nearly everywhere deer have been decreasing; in Curry County the elk have disappeared; however, in Coos and Douglas Counties the elk are on the incline. Mountain quail, bandtailed pigeons, grouse, fish, and bear populations have been reduced seriously. The decline of most of the smaller species is thought to be due to logging and the inhibition of the plant species upon which the smaller animals feed. The decline of the larger animals is also a result of hunting. One Cow Creek who hunts believes that the state should stop hunting seasons for three years for doe and pregnant elk. He buys a doe tag every year, just to keep someone else from getting one. Here is custodianship. Killing bear for sport was vigorously condemned; one informant told a bear hunter that the valley they were hunting in belonged to the bear, and if it came down to it, he said to the hunter, "I plan on helping the bear."

Encroachment of coastal development inland has reduced the numbers of some species of wildlife and has also affected the flora. Between the coast and ten miles inland the number of thimbleberries, salmonberries, and native blackberries have decreased because they thrive in the same bushy meadows chosen for housing development. And herbicidal spraying along county roads has also discouraged Native Americans from foraging in some of their favorite locations.

Forest Management

Contrary to popular notions, Native Americans managed the southwestern Oregon forests extensively, chiefly through a persistent practice of burning the forest understory, and much of today's forest bears the mark of such regular burning. They burned the understory for five principal reasons: (1) it opened up the understory so that animals could forage and Indians could hunt; (2) it provided fresh green shoots that would attract game; (3) it prevented a build-up of fallen timber that could lead to a major and disastrous fire; (4) it provided fresh hazelnut shoots essential for basket making; (5) it helped to control insects.

Contemporary Native Americans are critical of the BLM and U.S. Forest Service for not continuing such healthy forest management practices. Part of their complaint is aesthetics ("There is too much brush now in some areas, and this is bad: you can't look through the trees.") and part concern for the forest. A Cow Creek lady warned, "Some day there is going to be a big fire." And a Cow Creek elder observed, "You never used to see beetles like you do now. It comes from not burning

the rotten logs." Several informants reported that their parents and grandparents would set forest fires deliberately, as part of traditional Indian forest management. One informant told me of an uncle who was burning the forest right up until 1948, when the U.S. Forest Service hired him just to keep an eye on him. Another informant claimed that he would not be one to put out a fire and that he might even set one or two. The absence of burning has had a residual impact upon some ecological zones favored by Native Americans for food collecting. A Chetco informant complained, "That in-between zone has kind of disappeared, where it's like a prairie. A lot of species would grow in those places, like hazel nuts, mushrooms, the old blackberries, camas, and so forth." The reduction of such habitats is thought to be partly responsible for the decrease in game, both large and small.⁵

The natural diversity of southern Oregon's forests is respected, one could say even revered, by Native Americans, and their complaints about forest management become especially vigorous when it comes to the policy of timber companies, the BLM and the USFS to replant Oregon's forest with one predominant species, Douglas fir. The fast-growing Douglas fir is the most profitable species to grow, and it is being replanted to the detriment of other species vital to the health of the forest. As an 83-year-old Karuk lady commented, "The forest service has kind of ruined things around here. It has wrecked a lot of non-timber species."

Most of their concern is for the harmful effect a near monoculture will have on the birds and wildlife. A Coquille Indian summarized, "Timber companies only care about trees growing back. They're not concerned about where the marten live, or the otter, or the salmon. They have a narrow viewpoint—all they can see is trees. They don't see the relationship between the trees and the rivers." A 78-year-old Karuk man said, "All they think of is trees. They need to also consider the herbs, the plants, and the wildlife." A Coos Indian warns of the danger of making the forest over into a single predominant species, "Turning vast tracks of harvested land into one species of timber is just asking for disaster." Should a tree disease enter the forest, the lack of diversity would prove fatal.

This problem is compounded by the fact that the forest service relies upon seed that comes from a single source; hence, the natural genetic diversity which provides some protection against epidemics will not be available. All of the Native Americans questioned believed that seed trees were preferable to replanting, for in their experience seedlings from seed trees regrow faster than planted trees. All of them emphasized that the forest's diversity needs to be maintained. One Cow Creek elder questioned the U.S.F.S. claims that the new seeds are better and regrow trees faster. Tests on such seed were performed in experimental farms, not in the habitat of the seed tree. And a young Cow Creek logger reported that along the Rogue-Umpqua divide the best regrowth is natural, not seeded. But it is difficult to assess how much of their objection is based upon practical concerns and how much of it is aesthetic and philosophical—these people do not have the perspective of farmers. The religious value they place on the environment is a distinctly Indian concept.

While Native Americans generally supported the cutting of old growth, they opposed the cutting of young timber, complaining that young stands of trees were being cut prematurely. A Coos elder commented, "They are cutting too much small timber. All the local Indians feel the same. All the young timber coming back should be preserved. They're

cutting it off as soon as they think it's big enough." The reason for such cutting is that decisions are based upon what is economically prudent, not upon what is best for the health of the forest. The Indians' concerns are for the wildlife that the young forest maintains. One elder said that he believed that there were more spotted owls in younger timber than there were in the old growth, and the spotted owls were essential to keeping a growing rodent population down. Once again, the rationale behind the Native Americans' environmental position is their support for the maximum utilization that can be sustained without damaging the long-term health of the forest and wildlife.

There were a few suggestions that forestry practices were improving. Previously, canyons were logged to their middles and then just left to wash out. In recent years, operations have been trying to keep clear of the streams and canyons, leaving a strip of timber to hold back the mudslides during the rain season. There is still some gross negligence, and windstorms blow down some of the lines of protective trees, but most informants reported a general improvement in cutting practices. One retired logger believes that the forest service needs to make a more detailed assessment of the potential for regrowth before approving timber sales. In 1938, he cut many acres of Douglas fir in the Azalea district of Douglas County. On the western slopes the fir is growing back, but on the eastern slopes the regrowth has been surprisingly slow after fifty years. Another informant reported that an area along the Oregon-California border logged just after the turn of the century had never regrown its timber.

The most acerbic criticism of forest management practice was reserved for the policy of herbicidal spraying to eradicate species competitive with fir. Only one of all the persons interviewed supported such spraying, and this was because it was her husband's occupation. Many of the Native Americans had made formal objections to the U.S.F.S., and none of them had permitted spraying on their own property. According to the Native Americans the herbicides harm the vegetation and the birds, chipmunks, deer, elk and other wildlife depend upon them. One Karuk elder reported that when the forest service sprayed, the birds disappeared. A young Coos Indian claimed that there were no elk left from three herds after they were sprayed, and "A month after they sprayed you could still smell it." Cow Creek elder complained that since they began spraying there have been fewer bees. Another Karuk elder stopped keeping bees because so many of the hives have been contaminated. He recounted stories of cattle and sheep that died from eating acorns from oak trees which were sprayed. This Karuk elder observed that the bear, deer and chipmunks would no longer touch one of their major food sources, scrub oak acorn, after it had been sprayed. He commented, "I don't think the spraying is too good of an idea. It works alright; it kills the brush. But it probably kills everything else."

Other Native Americans expressed concern about the effects of herbicidal spraying upon humans, especially Native Americans who regularly hunt and gather food from the forest. A Coquille lady told me, "Now you don't dare go to those creeks." And a Coos man lamented, "It's all in the water we eat, and even the elk and game have it." A Cow Creek reported one USFS sign which read, "Do not eat the berries or game in this area," and a Karuk, expressing concern about the dangers of drinking water from the creeks, especially pregnant women, no longer drinks from the creek at the mouth of his house. Of all the environmental concerns expressed by Native Americans in southwestern Oregon, this was the

which disturbed them the most. They are disturbed further by the recognition that the reason for the practice is maximization of profits, "It's ignorant. I guess it all gets down to greed." Not only does it allow for quicker regeneration of timber (a contention disputed by some informants who argue that the elder and madrone are essential to shield young trees), but the policy of herbicidal spraying implemented now, permits an accelerated "sustain yield" forecast which serves as the rounds for more extensive timber-cutting licenses being granted in the present, with little regard for the long-term effects it will have upon the forests.

Politics

Despite their strongly held views on environmental issues, there is not a great deal Native Americans are able to do to affect public policy. Their numbers do not make a great electoral impact, and their resources are meager in comparison with those of the logging companies and other businesses. They have chosen to affect political change by joining the political process, working closely with state boards and commissions and with the various county commissions. All tribes reported good working relationships with their respective county commissioners, BLM, and U.S.F.S. districts, and their hope for the future is for younger tribal members to become more educated and develop the skills and expertise necessary for influencing the policy-making of the various environmental boards and planning commissions. Becoming part of the political process, however, has meant that to some extent Native American complaints have had to be moderated. Most tribes have simply concluded that they cannot take on the wide range of environmental issues that their members are concerned about, and they have chosen the more practical route of restricting their objections to damage to archeological, burial or sacred sites, domains for which the Anglo-American dominated government recognizes the Native Americans have a valid interest.

This has meant that a great deal of political frustration must be channeled into some confined political spheres, but within these domains most tribal boards have been very effective. State and federal regulations regarding archeologically sensitive areas oblige private owners to approach the tribe for permission to develop potentially sensitive areas, and this has led to the commencement of some constructive dialogue between Native Americans and corporations. When legitimate violations of burial and other sites occurs, the tribes can be quite potent, and have effectively halted projects pursued by lumber companies, the BLM, U.S.F.S. and the Bonneville Power Administration. The Forest Service has provided special management status for sacred sites and traditional meeting places, and the boards of county commissioners have also responded to legitimate complaints in these areas.

In all counties, however, tribal members have some serious environmental concerns about proposed development projects for which this narrow avenue of political influence is ineffective. To take only one such issue as an illustration, nearly all the members of the Coos and Coquille tribes that I interviewed were strongly opposed to the construction of a chromium plant on the North Spit, a sacred location additionally associated with the Coos people. Their feelings were both general, "The North Spit is in the process of being industrialized and it hurts," and specific, "The chromium plant will damage the shellfish and bottom fishing, and with our rains, a slag pile would inevitably leach into the bay." One

Coquille man reported to me that when the chromium plant left Montana, the Montanans said, "We haven't lost industry; we've lost pollution." Eureka, California, turned down the project on environmental grounds, but the company said that they could go to Coos Bay or to the Philippines. According to one informant, the poorly performing Oregon economy makes Coos Bay an easy target, "It (the North Spit) is one of the last few unspoiled places. We have very few unspoiled places around here; but if it means jobs, you might as well forget about it."

But the tribes are reluctant to voice sustained and comprehensive objections about the project. Opposition to development will lose them some support among the political establishment that has given them the bit of political influence they now enjoy. The tribal response must be constrained to objections about the burial ground that is there. Referring to the burial ground, one tribal official said, "This is what we are really concerned about." While Native Americans do have a serious interest in protecting burial grounds, such concern is not so much exclusive as it is what is practical. The Chetco, Cow Creek, and other tribes face similar dilemmas regarding such projects as dams, housing developments, toxic waste sites, etc; however, for the most part they are afraid to take on the city or county fathers for fear of the political and economic repercussions it might have upon tribal members. For the present, they are choosing to remain within the more narrowly subscribed areas of protection of religious practice, which has the legal protection of the First Amendment, or areas covered by other legislation regarding protection of archeological and historical sites.

Many of the trends in land use in southwestern Oregon have had a unique impact upon Native Americans, for many of their traditional activities are not consistent with modern development. A burial site on coast land is now private property, and the Native Americans are not permitted entry. In 1954, coastal Indians were forced by the federal government to sell a prime razor clam collecting site, where Native Americans used to gather for one-and-a-half weeks every June at the seasonal low tide; now it is owned by an absentee landlord, who has installed a locked gate and a caretaker who forbids entry. Other coastal lands were sold under similar duress to become state parks. Land along the riverfront in Douglas and Josephine counties has become so expensive that Native Americans cannot afford it, and in southern Curry County a real estate boom has priced Native Americans out of the market. Developments emerging at the fringes of towns occupy traditional food gathering sites. In rural areas pigs root up and eat camas (a major traditional food), and plowing and cultivation destroy it further. Frequently, the only locations where camas will grow is in the no-man's land between the barbed wire fence of a cow pasture and the herbicidal margins of the highways. In Coos and Curry counties introduced plants such as gorse have made it impossible for Indians to reach some of the old camps.

Prospects for the Future

Native Americans are divided regarding whether the future will bring improvements or continued environmental degradation. There is some optimism regarding an improvement in forestry practices and concern to plan for the longer term. One Cow Creek reported, "Now the Indian way of doing things is considered forward-looking." Also, some reported pleasure that an improved economy will make it more likely that their young people will not need to leave the

community in order to make a living. Other informants were pessimistic: "If they don't tighten up their act, there's not going to be a future;" and, "We're going to have to learn about wildlife in a book—they won't be able to see them."

Most of their concern for the future derives from a perceived inclination for responsible parties to abandon environmental responsibilities when faced with the possibility of large profits: "Money is the major environmental problem." Ownership is not custodianship. The feeling is that "white people are too interested in lining their pockets with gold and silver." Few Native Americans believe that economic progress justifies damage to the environment.

The current chairperson of the Coos tribal council told me, "The bottom line is the short-term dollar, the short-term corporate profits." And the former Coos chairperson summarized, "If a buck gets in the road, it's going to get worse." In such a fashion contemporary Native Americans are cynical about the ability of Anglo-American society to rearrange their land use policies in order to preserve or "keep" a balance with the natural environment. Recalling a comment his father had made to him many years previously, the former chairperson (in his sixties) said to me, while pressing his thumb and forefinger together, "The line separating progress and destruction is that thin."

NOTES

1. The author wishes to thank the Oregon Committee for the Humanities which provided grant support for this project.
2. The Chetco were an Athabascan-speaking people whose territory probably extended from the Winchuck River to Cape Ferriello, along the southern Oregon coast.

3. Formerly, the Cow Creeks were a semi-nomadic tribe whose territory was on the south fork of the Umpqua River and along the Rogue Umpqua divide.
4. This insight was suggested by Clayton Dumont of the University of Oregon Department of Sociology.
5. In some areas it is the policy of the U.S. National Park System and some U.S.F.S. districts to let natural fires burn. This is a recognition that fires have a healthy role to play in maintaining forests; however, they have overlooked the fact that in the past "natural" fires were not caused or controlled by lightning—for millennia fires were also set by humans managing the forest.

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Reconstructing Patterns of Indian Burning in Southwestern Oregon

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Introduction

Over the past two decades our understanding of the technological practices and environmental effects of hunting-gathering peoples' uses of habitat fires has grown significantly. In anthropology this interest developed with an initially small but steadily growing number of publications, almost all concerned with indigenous burning practices in North America and Australia. At the same time, these studies have been assisted by the corresponding development of studies and conclusions within ecology which have demonstrated how fires variably affect a wide range of environmental settings. The studies by anthropologists reflect the essentially idiosyncratic interests and individual efforts of a few ethnographers, ethnohistorians, and archaeologists; those of botanists, zoologists, and forestry scientists represent an established subfield within ecology, specifically the ecology of fire.

Among anthropologists, the earliest critical evaluation of hunter-gatherer uses of fire—essentially an overview of why North American Indians used fires—was provided by Omer C. Stewart who, writing in the early 1950s, was able to show that all known Indian groups used fire to influence environments (Stewart 1951, et al). Slightly earlier, the geographer Carl Sauer, whose work had a direct influence on Stewart, provided more theoretical and speculative interpretations of how he saw fire as being a fundamental part of prehistoric adaptations: from the uses of fire by Neolithic hunting-gathering peoples to the burning practices of proto-agricultural societies (Sauer 1947, et al). However, the first essentially ecological effort to deal with the environmental significance of Indian uses of fire was made by a biologist (Day 1955), with interpretations based upon historical accounts of Indian uses of fire in New England.

Though these works predate recent anthropological interests in hunter-gatherer uses of fire by two to three decades, none involved empirical field studies or participant interviews. For the geographical region of southwest Oregon, the absence of studies on traditional burning practices during

the first half of this century is especially unfortunate since, as some reports indicate, fires were still employed in isolated parts of northern California and southern Oregon as late as the mid-1950s. The problem in reconstructing the significance of Indian uses of fire is essentially two fold. Historical references and ethnographic comments normally provide very little detailed description of how Indians actually employed and, thus, effectively controlled fires. Secondly, they almost never include information about the knowledge, the local understandings, that people had regarding the networks of cause-and-effect that follow fires in predictable patterns (ecological successions) in different kinds of habitats. Until recently, we have known very little about the cultural perceptions that are fundamental for using fire as an effective part of hunting-gathering adaptations.

Though this author's interests in hunter-gatherer uses of habitat fires were partly stimulated by Stewart's and Day's overviews of Indian practices, the most important motivation for studying indigenous uses of fire came through several years experience as a "seasonal ranger" in Kings Canyon, Sequoia and Lassen National Parks in California between 1957 and 1968. An important aspect of working for the Park Service included the suppression of fires, most of them caused by lightning. At the same time, research as a graduate student in anthropology revealed that Indians had regularly set fires throughout most regions of California. Given the conflict between several years of park experience and "new" ethnographic information, an obvious paradox had to be considered: the differences between the actions of national and state agencies to prohibit and suppress fires in their efforts to "protect" environments, and the traditional and all but universal Native North American practices for "improving" environments through the frequent, periodic firing of grasslands, brush fields, parklands, and forests.

This clearly obvious contradiction between so-called modern and would-be primitive practices led to an extended survey of publications on California Indians in a search for references to indigenous uses of habitat fires. Approximately

one-fourth of the anthropological reports examined made reference to Indian uses of habitat fire, though most were limited to brief comments, some merely stating that Indians occasionally set fires while, at the other extreme, a few included one or more paragraphs about what was actually involved with lighting fires in particular areas and under specified conditions.

Yet, even in the absence of detailed descriptions on particular cultural groups and in specific environmental settings, a sufficient number of ethnographic and historic references existed for making cross-cultural generalizations about the ways that California Indians employed fires to influence plants and animals throughout a range of coastal and interior habitats. The subsequent comparisons of Indian practices and the interpretations that followed were largely possible, as noted above, as a result of developments in the field of fire ecology and the growing concerns of environmental agencies for carrying out pure and applied research on the effects of natural and man-made fires. The comparison of ethnographic references and ecological interpretations revealed striking parallels between Indian practices and what was being advocated by fire ecologists as a scientific basis for preserving what remained of California's wilderness areas—the same kinds of areas that once constituted the whole of California and which for millennia had been maintained by the technologies of hunting-gathering peoples.

Ecologists have emphasized the significance of a number of interrelated factors that must be considered in using fire as a management tool: the seasonality of burning, the frequency with which fires should be set, the kinds of habitats to be selected for burning (or not burning), the importance of natural fire controls (wind, temperature, relative humidity, fuel conditions, time of day, natural fire breaks, etc.), plus the patterns of ecological succession (ecosystems development) that regularly follow burning in different kinds of environments. Thus, by referring to the work of fire ecologists, it was possible to show that the Indians of central and northern California had employed practices remarkably congruent with what was being advocated by modern science as "new", alternative models to the accepted policies and practices of fire exclusion and suppression (Biswell et al. 1959). The comparisons between references to Indian practices and the then new studies on the ecology of fire became the basis for the monograph, *Patterns of Indian Burning in California: Ecology and Ethnohistory* (Lewis 1973). Using similar approaches, two other studies—Bean and Lawton (1973) on much of southern California, and Timbrook et al (1983) on the Chumash of the Santa Barbara region—confirmed the importance of like practices and equivalent ecological effects in other parts of California.

Anthropologists and Fire

If asked at all, inquiries by anthropologists (and others) about hunter-gatherer uses of fire are most frequently made in terms of "why" Indians burned grasslands, brushfields and forests (Lewis 1985a). For most observers, it was sufficient to ask if fires were set for specific purposes—e.g. to make conditions better for game, to drive animals, send signals, improve berry patches, reduce the build-up of fuels, or for "ritual purposes". While useful for initiating substantive questions about the technology and ecology of fire, by itself this type of questioning is analogous to asking farmers why they plow and expecting that the answers will explain what is

involved or understood about agriculture by plowing fields.

Questions regarding a people's understanding of how to start and control fires—their *technological knowledge*—and the perceptions of the causes and effects that result from different kinds of fires—their *ecological knowledge*—were thus effectively ignored, unfortunately at a time, as late as the 1950's, when there was still a great deal of traditional techno-ecological knowledge available. Today there remain only a few areas in the world where hunter-gatherers still use, or until recently used, burning as an integral part of hunting and gathering technologies. In the author's case, the study of a hunting-gathering peoples' traditional techno-ecological knowledge of fire was still possible through interviews of older Native People in northern Alberta concerning historically recent practices in the Canadian boreal forest (Lewis 1977, 1980, 1985a). Subsequently, informant interviews and field observations of contemporary, actively on-going practice involving hunter-gatherer uses of fire were carried out among Aborigines in northern Australia (Lewis 1989a, 1989b).

The claim that foragers consciously managed the distribution and relative abundance of plants and animals runs counter to the most basic of anthropological assumption about the limited effectiveness and restricted scope of so-called primitive technologies. Until most recently, the argument that foragers actually manipulated environmental processes has been especially difficult for prehistorians to accept given the maxim that hunter-gatherers, having only the simplest of tools could not influence the availability and increase the productivity of natural resources. The view that hunting-gathering societies do not, can not, sufficiently alter natural processes to serve human goals has been fundamental to the idea that the emergence of agriculture constituted a "technological revolution," a change from being environmentally passive to actively managing the distribution and relative abundance of selected plants and animals.

While many perspectives and approaches have been borrowed from the field of ecology over the past three decades anthropologists have been, and to a large degree remain unaware of or uninterested in developments in the sub-field of fire ecology. As is the case with the vast majority of Europeans and North Americans, anthropologists continue to see fire as an essentially if not inherently "destructive" force. Despite great scientific efforts and advancements in the field of fire ecology, most Euro-American societies continue to emphasize an extremely simplistic view about the "dangers of fire" which in North America, is still widely and officially propagandized in the anthropomorphic, totemic-like images of caricatures such as "Smokey the Bear," "Bambi," and (in Canada) "Bertie the Beaver." Except for limited efforts made by the U.S. National Parks and U.S. Forest Service to inform park and wilderness area visitors about the role of "natural fires," relatively little is done to inform the public about the importance of prescribed burning, though federal and state agencies have become increasingly involved in fire management practices.

Even beyond the textbook claims that hunting-gathering peoples can not "reshape their environment on a large scale" (Plog et al 1980:105), more serious and more ecologically specialized studies have continued to stress the inability of foragers to significantly influence environmental change. Until the agricultural revolution humans had a modest impact on the physical environment because their numbers were too small and the technology they used to transform energy was limited or sharply focused in its destructive potential (Bennet

However, fire, whether used by modern foresters or primitive foragers, is dispersed not focused and its "potential" is—when sufficiently understood and selectively employed—in the renewal of plant communities, not simply their destruction. At the same time, prescribed uses of fire involve a considerable measure of predictability for establishing and maintaining plant communities at early, more productive stages of ecological succession, managing ecosystems in a dynamic balance of what ecologists call "pulse stability." Whether used by "modern" environmental agencies or "simple" hunting-gathering societies, fire, as one aspect of technology, is not simply "destructive" nor is it "limited in focus."

The ecological importance of natural fire and the potentials that prescribed burning have for human adaptations are more fully understood and much better appreciated within the biological sciences.

Fire is a major factor that is almost a part of the normal "climate" in shaping the history of vegetation in most of the terrestrial environments of the world. As with most environmental factors, human beings have greatly modified its effect, increasing its influence in many cases and decreasing it in others. . . . It is thus an extremely important limiting factor if for no other reasons than that the control of fire is far more possible than the control of many other limiting factors (Odum 1983:278-279).

Indian Uses of Fire in Southwest Oregon

As other writers in this volume note, the historical and ethnographic record on southwest Oregon is relatively limited when compared to that of California and, correspondingly, references to indigenous uses of fire within the region are few. By contrast, for the Willamette Valley detailed reconstructions have been possible concerning Indian uses of fire, and writers have described the importance of indigenous practices for maintaining grasslands throughout all of central Oregon (Bowen 1978:60-61; Boyd 1987; Johannessen et al 1971; White 1983), while the author's work on California shows that indigenous fire management practices were widespread and effective just to the south of the Oregon-California border across the same range of habitat types (Lewis 1973).

Consequently, and despite the relative dearth of information on southwestern Oregon, the information available on northern California and the Willamette Valley make it eminently reasonable to assume that habitat fires were no less important for the Shasta, Umpqua and other tribes of the south and southwestern part of the state. With fire used extensively and effectively by Indians of the two adjacent regions, it is extremely unlikely, given the technological and ecological advantages of using prescribed burning, that fire would, or in fact could, have been ignored. In that the different environments of southern and southwestern Oregon are geographical extensions of those found in northern California, Indian practices of burning must have been functionally equivalent to those described for such tribes as the Miwok, Hupa, Tolowa, and Wintun.

Thus, grasses in the larger valleys, as well as those in surrounding oak-grassland areas, would have been fired beginning as early as late July and continuing through September. Among the reasons noted for burning grasslands at this time in California, as well as north in the Willamette Valley, were that fires initiate an earlier growth of grasses than

normally occurs following the onset of autumn rains, mists and cooler temperatures. The most effective "controls" for such fires would have been that such areas were annually burned, as were parts of surrounding habitat, all of this preventing the dangerous buildup of fuels as is characteristic of such areas today.

At slightly higher elevations the largest number of chaparral fires would have been set in the fall, creating a mosaic of variably aged stands of brush, with new growth areas providing the preferred, early-growth forage along with increasingly older stands of chaparral, important for the growth and development of a variety of plants and associated animal species. At the same time, this fire-based mosaic of young-to-mature stands of brush would have provided considerable protection against the spread of fires, natural or man-made, the kind of fires that today are frequently true holocausts and annually devastate large areas of brush and regularly destroy homes in parts of California. Some chaparral fires would have been set in the spring, this type of burning associated with plots used for growing tobacco. Spring burning the smaller stands of chaparral maintains more or less permanent openings, while fall burning results in an ongoing, cyclical pattern of young-to-mature stands of chaparral providing a succession of plants, many of which were important for hunting and gathering adaptations.

Broadly characterized, forested areas would have been burned in essentially one of two ways. Within those regions dominated by Douglas fir and ponderosa, fires would have been set to maintain an open understory of grasses and new growth shrubs, some being set annually or frequently enough that the build-up of fuels would have prevented the kinds of crown fires that have regularly occurred during most of this century. In marked contrast, relatively small areas of grasslands within coastal, temperate forests areas would have been burned like those reported for northwest California and western Washington (Lewis & Ferguson 1988:61-63; Norton 1979). These "yards" and "corridors" of grass were set alight on the small "prairies", ridge tops, and along the grass fringes of rivers so as to maintain areas of preferred plants and, correspondingly, to attract game.

In contrast to the open understoried forests of the relatively drier, interior regions, the understory areas of temperate rainforests were left unburned except for the relatively rare incidence of lightning fires and those that may have occasionally escaped the prescribed burns set by Indians or from lightning fires that occurred during extended dry periods or droughts. The argument for the importance of this kind of burning along the coast of Oregon is supported by identical practices noted for parts of northwest California, western Washington, and in climatically and environmentally similar sections of Australia (Lewis & Ferguson 1988:64-67; Norton 1979).

However, the argument for the importance of habitat burning in southwestern Oregon need not entirely rely on the existing few and scattered ethnographic references and what can be suggested by making cross-cultural inferences. Comments made by Native participants during the symposium indicate that among older Native residents there still exists some knowledge of how fires were used and how burning influenced particular plants and animals. An important example of this kind of knowledge was provided by Mrs. Sue Shaffer who, during her symposium presentation, noted that her uncle, Bob Thomason, continued to set fires during the early part of this century, adding that he was

eventually hired by the Tiller Ranger District so that they could "keep an eye on him". Subsequently, Mrs. Shaffer provided further information on how fires were employed in parts of the South Umpqua River region.

A portion of her written comments to the author included the following:

When I was a very little girl, I remember asking (Uncle Bob), "When do you do the burning?" His reply was always, "When the time is right." He would often go out in the field, away from the house and sniff the air, also wet his finger and hold it up (although there was no wind that I could perceive), and say, "Not yet" or "its time." I never knew on what he based his reasoning. The fires were set annually, but I'm sure on a rotating basis. As for time of year, it would appear that some burning was done in the early Spring, although the bulk of it was in the Fall, perhaps after the first rain, for even in aboriginal times the annual fires were recognized as a way to balance the ecology. After Fall fires, there was a quick greening, providing food for the forest animals.

The times of year are fully in keeping with how chaparral openings were maintained, those that were selected for regeneration having been burned in the fall, those in which the aim was to exclude chaparral (i.e., grass openings) would have been burned in the spring. Mrs. Shaffer's comment about his sniffing the air and wetting his finger, even when there was no wind, would have been for checking relative humidity to determine if conditions were too dry or too damp to have successful or desirable burning conditions. As in other regions, annual burning would have been a regular feature, with some grasslands burned every year (depending upon the kinds of grasses involved), others burned on a rotating basis, and with those chaparral stands burned during the fall being maintained at various stages of young-to-mature stands of ecological succession.

What the written comments provide, in addition to confirming the existence of burning practices within the Umpqua River basin, is an example of the kinds of evidence that may be more widely available for the region as a whole which, when considered by fire ecologists, can reveal a much more comprehensive picture of what was once involved with traditional uses of fire than is now available from ethnographic and historical sources.

Conclusions

As the example from the Umpqua River region shows, much more may be learned about indigenous uses of fire in this and other non-urbanized regions of North America. While additional written source materials may be forthcoming as a result of future contributions to public archives, the more significant sources of information may still be found with older people, both from what must now be an extremely small number of individuals who were once directly involved in the technology and ecology of fire, and a somewhat larger number of older people who at least know of such practices, if only by way of oral tradition, and in some cases having information about practices that are now one or even more generations removed.

Given the passage of time, questions and criticisms will undoubtedly be raised about the authenticity of such "recall data." However, given the kinds of ecological events involved, researchers can check the reliability of information in two important ways. Firstly, statements can be compared between informants both within and between regions, specifically where the same kinds of foraging activities and the same range

of habitats are involved, for southwestern Oregon the nearest functional equivalent being northern California. Secondly, reports can be further compared to what is already known about the ecology of fire for the specific areas involved specifically as derived from anthropological and biologic sources.

In these historically belated efforts to collect this kind of knowledge, local people, particularly native-tribal historians should play the decisive role in the recovery and eventual dissemination of new information on how North American Indians cared for and successfully managed local environments. At the same time, and when deemed necessary, the gathering and evaluation of such information can be facilitated by ethnohistorians and ecologists, specifically fire ecologists, in assisting tribal historians to both collect and interpret the traditional technological and ecological knowledge of fire. Cooperative efforts, involving tribal historians from several groups, could well result in providing a reasonably comprehensive understanding of what is both traditional wisdom and some of the "newest" interpretation from environmental science.

Since Stewart's compendium of practices was written in the 1950s, research and published studies on traditional uses of fire by indigenous populations in North America and Australia have conclusively shown that hunting-gathering populations successfully managed the distributions and relative availabilities of so-called natural resources. While enormous amounts of knowledge have been irretrievably lost, there are individuals having varying degrees of traditional ecological knowledge which includes insights into how prescribed uses of fires were once used to benefit plant production and affect the distribution of preferred plant species and, in turn, animals. Even though such knowledge may be much more limited than what was known by previous generations, it may, like pieces of a puzzle, provide a fuller picture of what was once a comprehensive yet everyday common understanding of fire technology and fire ecology.

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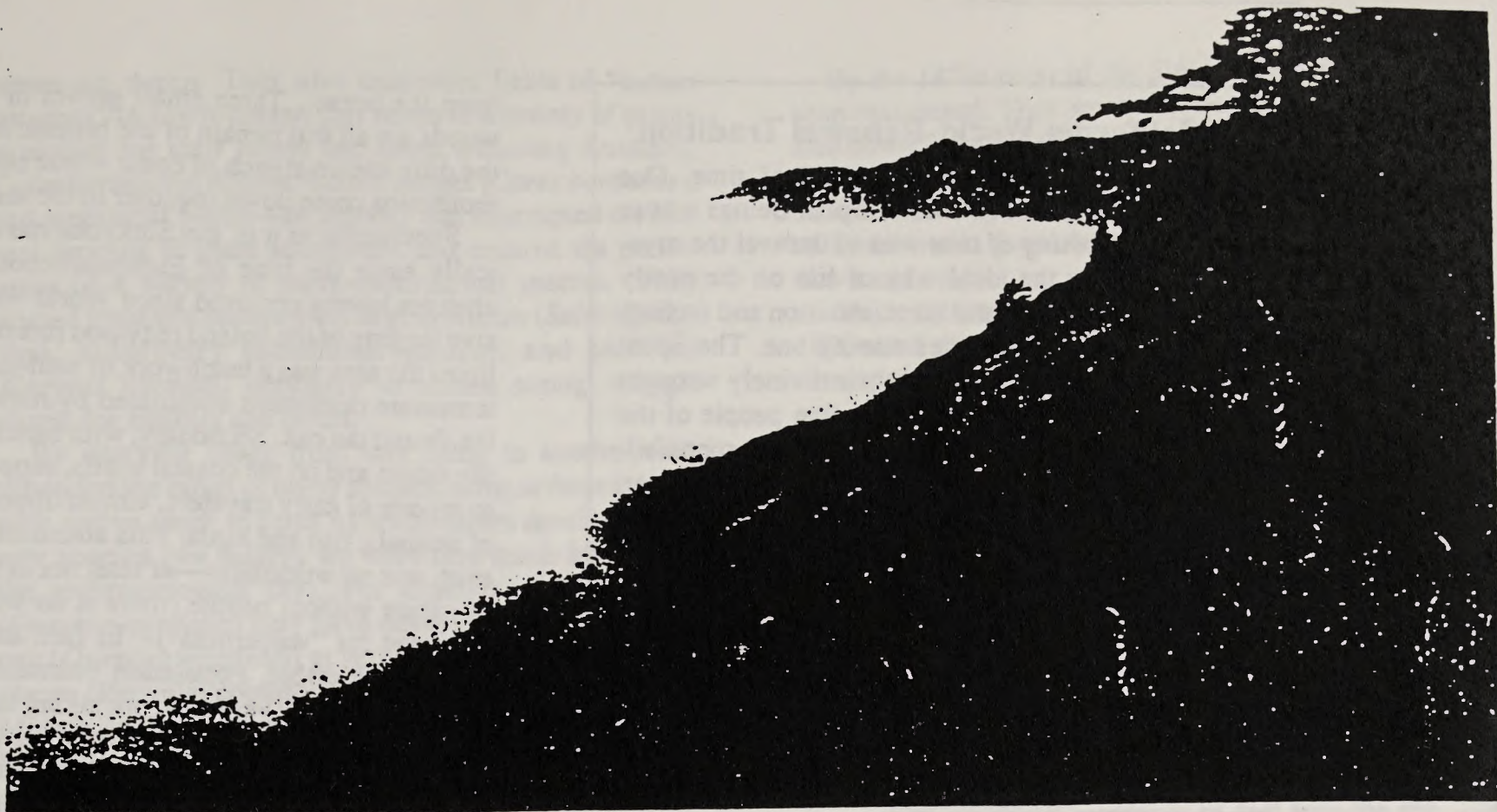
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Once by the Pacific—Sea fog, recognized by early Indian inhabitants and modern ecologists alike as a crucial source of moisture for coastal ecosystems, blankets the coastal ridges in the Sinkyone area south of Eureka, California.

Photo by W. R. Jordan III.

Northwestern Coastal Forests

The Sinkyone Intertribal Park Project

A coalition of Indian people is working to realize a vision of ecological and cultural restoration in redwood country.

by Dennis Rogers-Martinez

The first restorationist was the Creator of the earth. The Sinkyone Indian people of the northern California coast called him Nagaicho. One of the last fullbloods, Jack Woodman, told of a dream-encounter with Nagaicho:

Nagaicho came over Elk ridge and he saw where white man had peeled tanbark. He said to me, "It looks like my people lying around, lying around with all their skin cut off." He looked, he looked, he looked once more and he hung his head. He was sad, sad, and

he would not look again, he felt so grieved. Tanbark has great power and it all belongs to Nagaicho. He saw men breaking rocks and plowing up grass. He saw all things leaving and going back where they came from. He felt worst about the tanbark. Then Nagaicho told me that he wanted to make another freshet from the ocean—make everybody die so the world would come back as it used to be . . . You know this is the third time he wanted to make a freshet because the people are so bad (Nomland, 1935).

Today, some 120 years later, the forests of the Sinkyone country south of Eureka on the California coast still show the scars of more than a century of exploitation, and the timber industry threatens those forests that remain. Recently, however, the ancient Indian vision of land-healing has given life to a new plan for the future of the forest—not through the apocalyptic destruction of the human inhabitants, but through a coalition of tribes working with non-Indians and with state and local governments to acquire a sizeable tract of land in the area once occupied by the To-cho-be-keah (Shelter Cove) Sinkyone people in order to restore it to its historic (pre-contact) condition. Created for this purpose in 1987, the Intertribal Sinkyone Wilderness Council (ITSWC) has fostered a vision of both ecological and cultural restoration for the area and has begun to realize this vision in its plan for a 2,800-ha (7,100-acre) Sinkyone Intertribal Park.

The park would serve as a meeting ground for Indian people and as a place to carry on traditional ceremonies, and traditional hunting, fishing and gathering. It would

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The California World-Renewal Tradition

Our story starts at the beginning of time. Our knowledge stems from a race of Spirit Beings whose job *at the beginning of time* was to unravel the mystery, to discover the ideal way of life on the newly created Earth. By trial and error, intuition and feeling, they unlocked the mysteries one by one. The Spirit Beings were followed by, and their divinely wrought knowledge passed onto us, the Indian people of the Klamath River. In exchange, we assumed responsibility to Fix the Earth each year: to make the world over, through ceremonial re-enactment of the Spirit Beings' first successful World Renewal; to set the world back on its axis. Many of us today still subscribe to this belief. For us the vision of the future is grounded in the responsibility of annually fixing the world. We cannot conceive of a time when stabilizing the world will become an irrelevant act.

Julian Lang, Klamath Tribe
Introduction to *To the American Indian*
by Lucy Thompson

also serve as an educational center, providing Indians and non-Indians with information about Indian cultures and traditional Indian ways. Above all, Sinkyone would become a place to teach our children about the Indian way, a place to experience the forest directly and to learn how to relate to it in respectful ways, a place in which to experience the sacred. Sinkyone will provide an opportunity for Indians and non-Indians to work together on hands-on land restoration work and to learn traditional Indian land management methods.

In this way, the project offers an ideal opportunity for the Earthkeeping program being developed by the Society for Ecological Restoration and the University of Wisconsin-Madison Arboretum to provide opportunities for people to participate in restoration projects at selected sites as a way of learning about natural ecosystems and their history. As a result Earthkeeping is now part of the developing vision for the future of the Sinkyone. What follows is a brief account of the project from my perspective as consulting restorationist for ITSWC and as an American Indian.

The area known as the Sinkyone is in rugged, mountainous country (often exceeding 80 percent slopes), along the coast between Usal and Whale Gulch in northern California. Visitors driving up the coast on Highway 1 or 101 skirt the area—its ruggedness discourages road building and is one reason the area still retains at least some of its natural character. Here unpaved Mendocino County Road 431 (formerly a haul-road for logging) follows the first main ridge paralleling the sea through thick second-growth brush, Douglas-fir, tan oak, redwood, madrone and chinquapin, and provides excellent views of the Pacific from elevations of around 1,200 to 1,500 feet straight up

from the ocean. Three small groves of old-growth redwoods are all that remain of the historic redwood forest in the only known stretch of coast where both redwoods and mountains come down together to the sea.

Spectacular as it is, the Sinkyone has changed dramatically since the time of European contact, most of the changes having occurred since World War II when intensive logging of the upland redwood forest began. In Indian times the area was a patchwork of well-spaced old-growth temperate rainforests dominated by redwood with Douglas-fir and tan oak. Secondary, with bunchgrass prairies on the ridges and on the coastal bluffs, supporting, according to reports of early travelers, almost unbelievable numbers of animals, fish and birds. This abundant landscape, however, was no wilderness—at least not in the modern sense of nature without people (there is no word in any Indian language for “wilderness”). In fact, Indian populations were considerable. Population estimates by anthropologists are typically very low, not taking into account losses of up to 80 percent or higher from European diseases in the late 18th and early 19th centuries (even before actual contact). Nevertheless, according to these conservative estimates, northern California had the largest population of aboriginal people north of the Valley of Mexico. Moreover, their attitude was not that of the modern-day preservationist. “When people don’t use the plants, they get scarce,” an elder of the Makahmo Pomo once said. “You must use them so they will come up again. All plants are like that. If they’re not gathered from, or talked to and cared about, they’ll die.”

Accordingly, the people used the resources available to them, and the landscape in which they lived was shaped by their activities including hunting and gathering, both intensive and extensive forms of agriculture, and—especially—burning. Fires deliberately set by Indian women created the park-like look written about by early California travelers. Land health was directly linked to the health of the people, and the health of the land depended on fire. Competence in prescribed burning, therefore, was critical to survival, and the burning maintained a relatively open landscape made up of a mosaic of trees, shrubs, bunchgrasses and forbs. This rich complex of ecological communities ensured a high level of biodiversity and ensured the Indians a variety of animal and vegetable foods. All levels of succession were represented in the same forest—from the pioneer to the climax stage.

Whites referred contemptuously to the Indians of this area as “Diggers”—a reference to the digging sticks the women always carried and used to harvest various underground plant parts. Anthropologists still refer to Indians like the Sinkyone as “hunter-gatherers.” But there is no hard and fast line between hunting and gathering and what Europeans called agriculture. Sinkyone Indians employed both extensive and intensive resource management techniques, including pruning, cultivation, weeding and clearing, selective harvesting and planting, game inventory and management—and of course controlled burning. What they practiced was a kind of agro-ecology.

The Indians kept collecting areas clean by weeding and

→ removing debris. They also cultivated fields of "Indian potatoes" (a catch-phrase that refers to a variety of plants exploited for their tubers and roots, including *Brodiaea*, *Calochortus* and *Allium*, basket sedges (*Carex barbarae*), and medicinal plants—an activity that interrupted the natural process of plant succession and ensured the persistence of a variety of early-successional species. They pruned trees and shrubs such as gray willow (*Salix Hindsiana*), elderberry (*Sambucus glauca*), and hazelnut (*Corylus cornuta*) regularly to ensure strong, straight shoots for baskets and flutes.

By carrying seeds from one camp to another, they expanded the range of many species; some of these crossed with native stock to form hybrids; others developed into new species (we believe we were here much longer than the anthropologists say). For example, coast live oak (*Quercus agrifolia*) may have developed into interior live oak (*Quercus wislizenii*) as acorns were planted in interior places (Personal communication from David Peri, Coast-Miwok Indian and professor of anthropology, Sonoma State University, Cotati, California). Coast live oak produces a bitter acorn but makes abundant crops every season. The preferred acorns from tan oak or black oak make good crops only intermittently. Therefore, the coast live oak provided a valuable back-up source—an incentive for Indians to plant them inland, expanding their range. There is reason to believe that activities such as these strongly influenced both the vegetation and the distribution of species in the landscape. In fact, Peri has suggested that large tracts of ethnobotanically important species in northern California are largely the result of Indian planting and harvesting activities over thousands of years.

X These activities were, however, regulated by a complex system of social sanctions and religious taboos. Among the well-developed ceremonial traditions were rituals of world renewal, which were carried out periodically to renew and revitalize the earth through ceremonial contact with the spirit world, realm of Natural Law (see box). These traditions, implicitly acknowledging effects of people on the landscape and life forms dwelling there, and seeking to reverse or compensate for it, are common to many indigenous cultures. Today these are being revived by some tribes, and provide a ceremonial and cultural tradition that closely parallels at a spiritual and emotional level what the restorationist seeks to achieve in the landscape itself.

The Indians of the Sinkyone area lived for at least 8,000 years in traditional ways, little influenced by European culture until the middle of the 19th century. The landscape, too, remained largely as it had been for thousands of years. This changed abruptly however, with contact with Whites during the 1860s. Major ecological changes occurred following contact with the development of cattle and sheep grazing, tan oak bark peeling for the tanning industry and redwood logging. This violent exploitation of the landscape was accompanied by a systematic assault on the indigenous people—a program of genocide that was a part of one of the most shameful chapters in the history of our nation.

By the 1870s most of the Sinkyone Indian people had been massacred. They were shot down like deer for sport, shot down and scalped for bounties—25 cents for children, 50 cents for women and one dollar for men. And then the earth itself was peeled of her hair, her beautiful green skin of forest trees. Even the sacred redwood trees were cut down and sold.

Major clearcutting of the redwood forest began in the 1890s and continued until after the turn of the century, mostly near the sea, in the more accessible alluvial flats and stream mouths. Following World War II, the upland forest was logged as well.

The last cutting was made in 1985 by Georgia-Pacific under timber harvesting plans approved by the California Department of Forestry. Three pitiful groves of old-growth redwood remained— islands of a few hectares in a sea of thousands of hectares of clear-cut devastation on the "Lost Coast" of Mendocino.

Ecologically, the results have been catastrophic. Researchers have described the North Coast watershed as the "most rapidly eroding, non-glaciated basin of comparable size in North America." The Sinkyone is a land of precipitous cliffs dropping hundreds of feet into the sea. The fragile, fragmented Franciscan sandstone and melange of metamorphic rocks are always falling into the sea. But the luxuriant vegetation has historically slowed erosion. Now the scalped land unravels westward to the sea at an ever-increasing rate.

Today, even on the old skid roads, the Sinkyone is so choked with second-growth forest that in many areas it is difficult to walk cross-country. Douglas-fir is coming up in thickets of buckbrush (*Ceanothus* sp.) which earlier had invaded redwood groves following clear-cutting and intense slash fires. The ridges, where the people lived, are choked with manzanita (*Arctostaphylos* spp.), buckbrush and exotic and native pioneer species such as pampas grass (*Cortaderia selloana*), and coast cut-leaf fireweed (*Erechtites arguta*). Indian burial grounds and artifacts and the old Indian trails, which once linked forest openings maintained by Indians and led inland from the coast, have been obliterated by skidroads. And many of the plants once used by the Sinkyone people for food, for medicines, and for materials are either gone or rare. Native clovers were once abundant and widely used for food. At least five species are never seen now. And the native coho salmon, trout, and many species of frogs and salamanders are extinct or nearly so as a result of sediments washed down to the stream from the eroding slopes. Many Indians from the area still go to the Sinkyone to gather seaweed, mussels, surf-fish and abalone, but it is a pitiful harvest compared to former times.

Thoughts of restoration, of bringing back the forests and grasslands of the Sinkyone and making it once again a suitable place for its people began in 1985 when a coalition of local environmentalists and Indians (among whom were Richard Gienger, a non-Indian rnanan and fisheries restorationist, and Fred "Coyote" Downing, a Wailaki Indian elder, who are still working with ITSWC) sued the California Department of Forestry and the

Georgia Pacific Corporation for failure to consider the cumulative impacts of clear-cut logging and failure to protect Sinkyone Indian burial sites. They won their suit in 1985, and Georgia Pacific quickly sold the 2,800 hectares that comprise the area now targeted for acquisition and restoration by ITSWC. A bit over half went to the Trust for Public Lands, the remainder to California Department of Parks and Recreation.

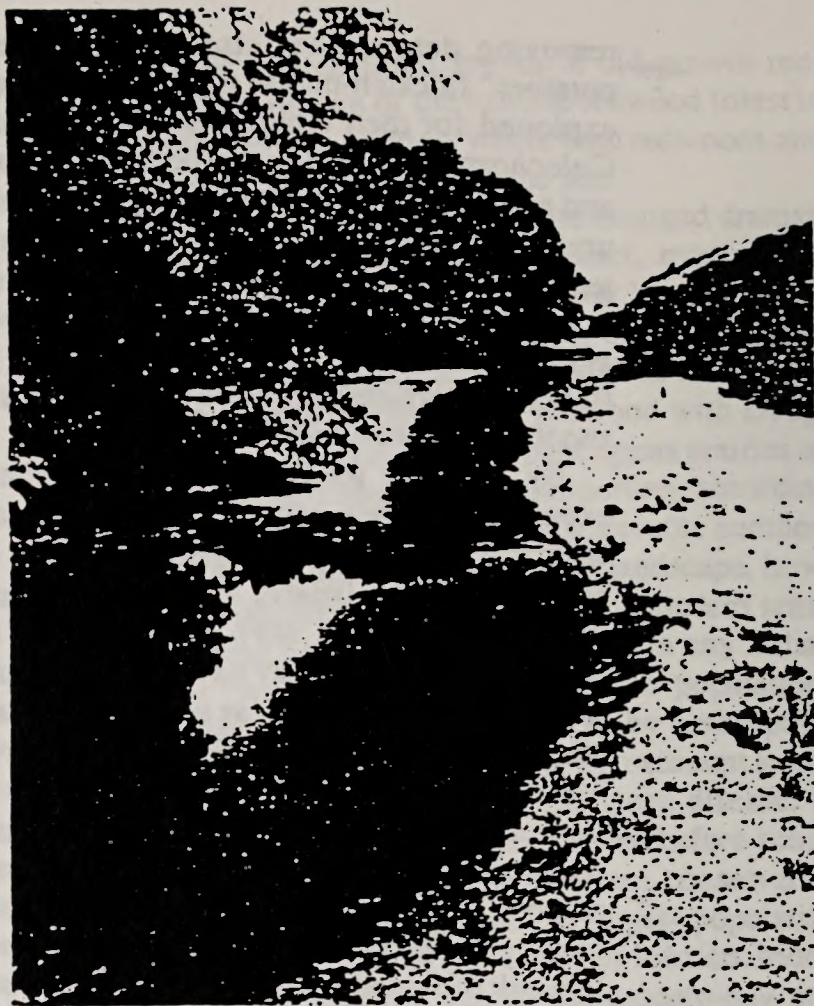
Encouraged by this stay of execution, Bill Wahpepah and Ricardo Tapia of the International Indian Treaty Council formed a coalition with local environmentalists to stop further cutting, protect burial sites and gain access by Indian people to traditional hunting, gathering and fishing places. This initiative led to the formation of ITSWC, which currently operates out of the tribal offices on the Coyote Valley Reservation (Pomo) near Ukiah. Priscilla Hunter, Coyote tribal administrator and then chair of the California State Indian Heritage Commission, lent her considerable authority to the struggle to protect burial sites. In 1988 the Treaty Council requested me to work with the Sinkyone Council as restoration consultant.

What do we mean by "restoration"? In the January/February 1989 issue of *News from Native California* I was quoted as follows:

* Restoration is not reforestation. It may include reforestation, but it is much more...Restoration is the bringing back together of people and land in a close working relationship to ensure the health and survival of both. It includes the restoration of respect for Natural Law. But to get to that point of harmony, we are forced to grope in the present darkness—in our ignorance of natural processes—with poorly-defined Euro-American management tools and limited scientific concepts. We must seek out elders who have some memory of what the old-growth Redwood Forest was like, who remember the plants that were used for medicine, baskets, food, who remember which plants, animals, birds, fish, insects are no longer with us, where they lived, how many, etc. Above all, we need to seek guidance from the Creator in our restoration efforts. We need to ask our elders how to pray to the Spirits that inhabit the Sinkyone, the Spirits that live in the trees, streams, springs, rocks for guidance and understanding.

We must use as best we can the newer management tools of Euro-America, which are appropriate to the new destruction—the scale of which no indigenous people has had to deal with before modern times. As we work on long-term forest restoration, we must bring together our own indigenous knowledge, spiritual heritage, respect for Natural Law, with those Euro-American management tools which conform most closely with natural systems and Natural Laws.

What do we want to restore? We want to restore life. We want to restore the living and sacred relationship between the people and the earth. We want to restore our spirits as we restore the land. We want to restore our



Hazel Gulch, a tributary of Ukiah Creek in the Sinkyone. Waterways like this one provide spawning habitat for Pacific salmon and opportunities for restoration, both in the stream itself, and along its shores.

Photo by W. R. Jordan III

culture, our songs, our myths and stories, and the Indian names for creeks and springs. We want to restore ourselves. This is what we want to restore at Sinkyone.

Our model for this work will be traditional Indian land stewardship. For knowledge of this we will depend in part on descendants of the Sinkyone people and closely-related tribes. Anthropologists say the Sinkyone are extinct. We know better. The ITSWC has interviewed forty individuals, many of whom have direct genealogical and historic connections with the people called Sinkyone. The native peoples of the area know better than anyone what is going on with the land—where the deer are fawning, how many good soil/water indicator plants are left, which exotic plants and animals are invading, and so forth.

In developing our restoration plan we've used word lists from now-extinct Indian languages to find out what plants and animals were there in pre-Columbian times. From this information we're developing our own endangered species list—plants and animals that may not be on the official lists but that are locally missing or present only in greatly reduced numbers. These include many plants used for medicine, food and fiber, as well as spiritually important animals and birds. Deer, bear, coyote, mountain lion and many species of native rodents and seed-eating birds—all species characteristic of the early- to mid-successional communities common in the area today, are abundant. Animals characteristic of old-growth forests—martens and fishes, salamanders, insectivorous birds and

the notorious spotted owl—are missing or present only in much reduced relic populations. Salmon and steelhead are nearly gone.

What we are seeing in the Sinkyone is the first phase of classic desertification, a pattern evident not only here, but in many areas of the mountainous West as old-growth forest is removed, reducing both humidity and, in coastal areas, collection of moisture from sea fogs. The bird most sacred to the Sinkyone people, the American condor, may be extinct. Eagles and ravens—powerful medicine birds—are seldom seen, but still exist in the Sinkyone and might be brought back in greater numbers.

Early records show that the temperate rainforests of the Sinkyone were dominated by redwoods, with Douglas-fir as a secondary co-dominant. My survey in 1990 documented a clear shift in favor of the more xerophytic Douglas-fir and tan oak. Among understory plants I also found evidence that the more moisture-demanding species are declining. Members of the lily family were especially hard to find. (This reflects a general pattern in the western mountains. More than a fifth of the species officially listed as "sensitive" by BLM and the Forest Service are members of the *Liliaceae* that are dependent on moist, fertile soils.) Of the native bunchgrasses once abundant in the area, only Nootka reedgrass (*Calamagrostis nootkanensis*) is still common. Others, notably species of *Stipa*, *Poa*, *Agrostis*, *Danthonia*, and *Festuca* are very rare.

In grassland areas on the bluffs above the sea the major influences have been overgrazing by cattle, the introduction of exotic plant species, and the absence of the prescribed fires of the pre-contact era. Coastal grasslands have been replaced almost completely by exotic perennials like Australian hairy oatgrass (*Danthonia pilosa*) and German velvetgrass (*Holcus lanatus*) and, in the absence of fire, are being invaded by coastal scrub and salt-tolerant Douglas fir. Native forbs are also scarce. Something conservationists tend to forget: Grassland restoration is not just for the Midwest!

The reason we say that restoration must precede sustained logging (assuming that is even possible at Sinkyone) is that Sinkyone is a marginal site for redwood regeneration. We've documented the beginning stages of desertification in the shift from mesic to more xeric species, which reflects the loss of topsoil, as well as the loss of the tall old-growth humidity-trapping canopy. A climatic anomaly, called by Paul Zinke of UC Berkeley (in *Terrestrial Vegetation of California*; Barbour & Majors) the Mattole Backeddy, begins just north of Sinkyone and includes all of Cape Mendocino. This is where the redwood forest retreats inland to the Eel River, being replaced by extensive coastal grasslands and scrub, brush, Douglas-fir and hardwoods. The King Range (the highest rise in elevation known on the Pacific perimeter in this hemisphere) is whipped by fierce winds which create desiccating down-drafts of warm air. On a smaller scale the steep Sinkyone mountains create the same drying effect. There is just enough sea-fog to nurture redwoods, but because of the downdrafts it doesn't stay long enough to provide the moisture needed for good regeneration in the absence of a

forest canopy and undisturbed soils. This regional climatic drying due to deforestation may erase what little margin is left, and the process would only be accelerated by global warming.

The Indian people of the North Coast knew that the redwood trees guarded the water. Countless generations of Indians saw the giant trees capture sea fog, saw it drip down to the ground, saw it come out again in springs on the ridges where the people lived. This knowledge was expressed in the stories the elders told to the children—deep metaphors of the Sacred containing life-sustaining, ecological information. When we retrieve these stories we are restoring that deep ecological knowledge for future generations.

Restoration of the water is our main goal at Sinkyone. Everything else will follow from that. Our first job will be thinning and fuel load reduction. The management plan we currently are developing will help in determining our site-specific priorities. We will work within a long time-frame. Hand-thinning will provide employment for the Indian and non-Indian communities. Marketing strategies for both redwood and Douglas-fir saplings and hardwoods will need to be developed. Earthkeeping volunteers will be an important complement to our restoration efforts. The California Department of Forestry could pay up to 90 percent of the thinning costs.

The next task will be to start the slow process of bringing back the tall, moisture-trapping forest canopy. We plan to thin redwood stump sprouts in logged areas from 7-15 to only one or two per stump. Where the redwood stumps have failed to regenerate due to damage by intense slash fires or equipment, and where *Ceanothus* thickets (especially on south and west slopes) are now nursing Douglas-fir seedlings, we will hand-plant nursery-grown redwood seedlings. (A native plant nursery is another possible source of support for the restoration work.)

The way we will do this may serve as a model of holistic planning and implementation—a model the agencies simply are not able to provide. For example: instead of cutting the young *Ceanothus* to make way for redwoods, we will simply allow the short-lived (15-25 years) *Ceanothus* to begin to die before planting. The nitrogen-fixing *Ceanothus* will start the slow process of rebuilding the forest soils, check erosion and provide shading for the young redwoods. As the brush dies and collapses (further protecting and rebuilding soil), exotic grasses will begin to invade, competing with the young trees for nutrients and water. To prevent this we may seed the native biennial or short-lived perennial meadow barley (*Hordeum brachyantherum*) at the time of redwood planting. It is a poor competitor and will not overrun the young trees. It will also act as a buffer to slow down more serious competitors. After two or three years we would then seed a long-lived native bunchgrass like purple needlegrass (*Stipa pulchra*), which takes two or three years to become well-established. By the time the *Stipa* is a serious competitor (five or six years after the tree planting), the redwood root system would be deep enough and extensive enough to withstand grass. We know from our historical

model something managers have tended to forget—that Nagaicho meant grass and trees to grow together.

Nagaicho also intended that the grass should carry rejuvenating fires. When the redwoods are large enough (around 20 years), we will be able to burn. This, along with the formidable root system (root-to-shoot ratio of 10:1), will retard brush re-invasion, which is a principal reason for regeneration failures in western mountains. The decomposition of the bunchgrass root systems will do the main job of soil rebuilding until around 100 years when the litter from the large redwoods will permanently replenish the soil. The grasses in the meantime will gradually be shaded out in some places, but will remain permanently in other places as little meadows between well-spaced redwoods. Native forbs will be introduced with the bunchgrasses at initial seeding and reintroduced as necessary following burning. Native shrubs and ferns will also be introduced following the burns (probably on eight-year or longer cycles), and periodic light fires will be reintroduced. As the vegetation recovers, hydrological processes will recover as well, and springs will once again flow year-round, as in pre-contact times.

If water is the blood of the Mother Earth, then the streams are her blood vessels. The great floods of 1955 and 1964 devastated streambeds, undercutting banks and widening channels to as much as ten times their previous width. Now efforts by organizations such as the Civilian Conservation Corps, the California Fish & Game Department and private contractors working with ITSWC to construct fish ladders, remove obstacles, and stabilize banks have begun to pay off. In February, 1992, we heard the thump-thump of many spawning steelhead at Sinkyone's Jackass Creek for the first time in years. Much work, however, remains to be done.

Another project will involve planting of redwood seedlings in groves of red alder (*Alnus oregana*) that line the lower reaches of the Sinkyone streams. These originally served as nurseries for redwood regeneration, but no redwoods have appeared in the thickets since the nearby redwood groves were cut and the streams began silting up (sediment loads are now up to 85 times what they were prior to 1955).

A distinctive feature of the project will be its ecological and cultural integration. Upland restoration will proceed hand-in-hand with restoration of waterways and wetlands, and cultural recovery will accompany recovery of the land. In the past ecological restoration projects have been defined almost entirely in landscape terms, but the Sinkyone project will be different in that it will also involve the restoration of indigenous cultures, which we recognize as a major factor in the ecology of the systems we aim to restore. In other words, what we aim to restore is not only the land, but our relationship with it. The project rests on our understanding that the landscape and the people, nature and culture, are ultimately inseparable. The land reflects culture, just as culture reflects the land. Hence restoration of the historic landscape of the Sinkyone depends as much on restoration of the historic Indian cultures that helped shape that landscape as on restoration of old-growth forest and bunchgrass prairie.

In this way the Sinkyone project represents a vision for

a renewal of the human relationship with nature—and also for the achievement of a healthy relationship between cultures, for the success of a project like the Sinkyone restoration will depend ultimately on cultures working together, and on the European culture now dominant in the area recognizing the indigenous Indian cultures as part of its own heritage.

As an Indian, in this 1992 Quincentennial year, I want to express my conviction that the continuance of this traditional Indian heritage is essential to land restoration. Restorationists, by restoring ecosystems, also restore medicine plants, birds and animals that Indian people need in order to perform world-renewing ceremonies. In turn, these Indian ceremonies help renew the world. This simple truth has been ignored by the dominant culture for 500 years. We are hanging on by just a thin thread. But this thread is the last living link between the native past of all of us in this global village and the future of our children. That is why we *must* work together.

People from both cultures have a crucial role to play in the restoration of the Sinkyone. Already two or three times each year local Indians gather at Usal Beach in the Sinkyone to perform traditional dances and feast on local traditional foods like surf-fish, salmon, seaweed, abalone, tan oak acorn soup, mussels and deer. Many non-Indians support and attend these gatherings.

Last year the Tule River people brought to the Sinkyone their Bear Dance, the first time a Bear Dance had been performed at Sinkyone in 140 years.

And the old people said:

Nagaicho made the world and patted it down so everything would stay in place. But bad men were not satisfied and tore it down, tore up the ocean banks, tore up the trees, tore down the mountains. Since that time we have had to sing and dance every year to make it right again.

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Save cultures w/ restoration
projects instead of mere artifacts
Restore relationship w/ land.



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PROGRESS REPORT ON THE APPLEGATE COMMUNITY ASSESSMENT

AGENDA
January 25, 1994

1. Objectives, What we want to accomplish
2. Scope of Work, How we will accomplish objectives
3. Preliminary community description
Major social and economic trends
Key publics and issues
4. Issues related to forest management
Local perceptions about the Applegate Partnership
Public issues about forestry practice
5. What's next?
A management framework for the watershed plan
Concepts
Maps and Neighborhoods
Action sets so far
Phase 2 scope of work

OBJECTIVES OF THE COMMUNITY ASSESSMENT

1. Help the Partnership understand how the community works so it can anticipate community concerns and improve management decisions.
2. Improve community participation in planning and implementing forest management in order to gain the support of the community.
3. Create jobs, a diversified economy and community improvements consistent with ecosystem management.

SCOPE OF WORK
COMMUNITY ASSESSMENT OF THE APPLGATE VALLEY

Phase One

1. Describe the major publics in the area, their lifestyle routines, and their interests in relation to forest management.
2. Describe the major communication pathways by which people pass along information. These may be formal (such as clubs and organizations) or informal (through social networks).
3. Identify the major issues which people carry with regard to forest management.
4. Using existing information and interview data, identify the major social, economic, and demographic trends affecting the area.

Phase Two

1. Identify regional and national publics which make use of the study area or which have an interest in public land management of the area. Determine their interests, their level of use of the area, evidence of economic benefit from such use, and the manner in which they wish to be included in Applegate Partnership decisions.
2. Provide the community with the results of the Phase I assessment and assist the community in formulating a vision of community health objectives and the means for monitoring them.
3. Assist the natural resource agencies in anticipating key issues likely to surface with potential decisions and in responding to the issues as possible through the course of management activities.
4. From the ecological assessment, determine the constellation of new economic opportunities which are possible with ecosystem management. It is expected that new opportunities could include: citizen monitoring, stewardship programs, forest health restoration projects, new forest products, value-added woods products, and non-forest related business development.
5. Work with residents to develop economic activity consistent with ecosystem management by resolving obstacles, promoting organization, and offering technical assistance.

Existing Social and Economic Trends In the Applegate Valley

Employment and income in the natural resource sectors (timber, agriculture) has declined and trades and services employment are increased. Transfer income from retirement community increasinly important in the economy.

Population has still been rising at a steady rate and is based on in-migration.

In-migration has increased the demand and costs of land and housing, creating high rent conditions for those with low-income and favoring out-migration for some. High property values are problematic, especially for those who don't want to move and are complained about by old time families.

Higher population density is associated with more homes in ever more remote areas. Nearly every drainage and sub-drainage with a road now have homes. The irony is apparent to newcomers who fight timber sales. As an environmentalist told us: "Let's face it, we all live at the end of logging roads."

Commuting is more and more important

For an increasing number of local residents, ties to the land for livelihood are decreasing.

Crime is up. Jackson County Sheriff reported that the population has gone up 6%, crime by 10-20%

The Publics of the Applegate Valley

Occupational Publics

Ranchers	Small woodlot owners
Farmers	Tree planters
Dairy farmers	Vineyard owners
Hobby farmers	Christmas tree growers
Loggers	Artists
Millworkers	Firewood Cutters
Log haulers	Timberland owners
Building contractors	Heavy equipment operators
Miners	Agency personnel
Local entrepreneurs (cottage industry)	Wildcrafters
Global entrepreneurs (lone eagles)	Educators
Trades and services businesses	Real Estate Professionals

Publics Based on Age, Gender, Interest or Lifestyle

Retired	Women
Teenagers	Christians
Alternative lifestyle, counter-culture	Commuters
Lions Club	PTO
4-H	

Length of Residence

Newcomers	Mid-timers	Oldtimers
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Non-local Publics (regional and national)

environmental groups	Hispanic contractors
timber lobbying/monitoring groups	

Recreational Publics

hunters	fishers
backcountry recreationists	off-road vehicle users
swimmers/lake goers	equestrian

Formal Publics

Jackson County Board of Commissioners	County Extension
Josephine County Board of Commissioners	U.S. Forest Service
Bureau of Land Management	Farm Bureau
Oregon Dept. of Fish & Wildlife	Corps of Engineers
State Dept. of Forestry	Bureau of Reclamation
Dept. of Water Resources	Soil Conservation Service
U.S. Fish and Wildlife	Or. Dept. Transportation
Cattlemen's Associations	Small Woodlands Assns.
S. Or. Timber Ind. Assn.	

Millworker Issues

wages

fast-cut regimes of some companies

Logger issues

They feel squeezed out by mills and the large companies;
they want a return to sealed bids.

They want small contracts from agencies.

No more clearcuts.

Get the dead and dying trees harvested

Overcruising: 90 days to get money back if at all

Reserve areas should not be off-limits

Short term contracts, keep logs moving

Bottom line: "I want work"

Ranching Issues

Grazing: "They're squeezing out cattle."

Interface: "There are too many people."

Farming Issues

Water

Zoning, land restrictions

Alternative Community

Want to work locally

No clearcuts

No old growth entry, at least for awhile

Diversity for its own sake

Special forest products: need to identify, develop, license;

interest in impact assessment of sfp habitat from timber harvest.

Stewardship interests

New forest products

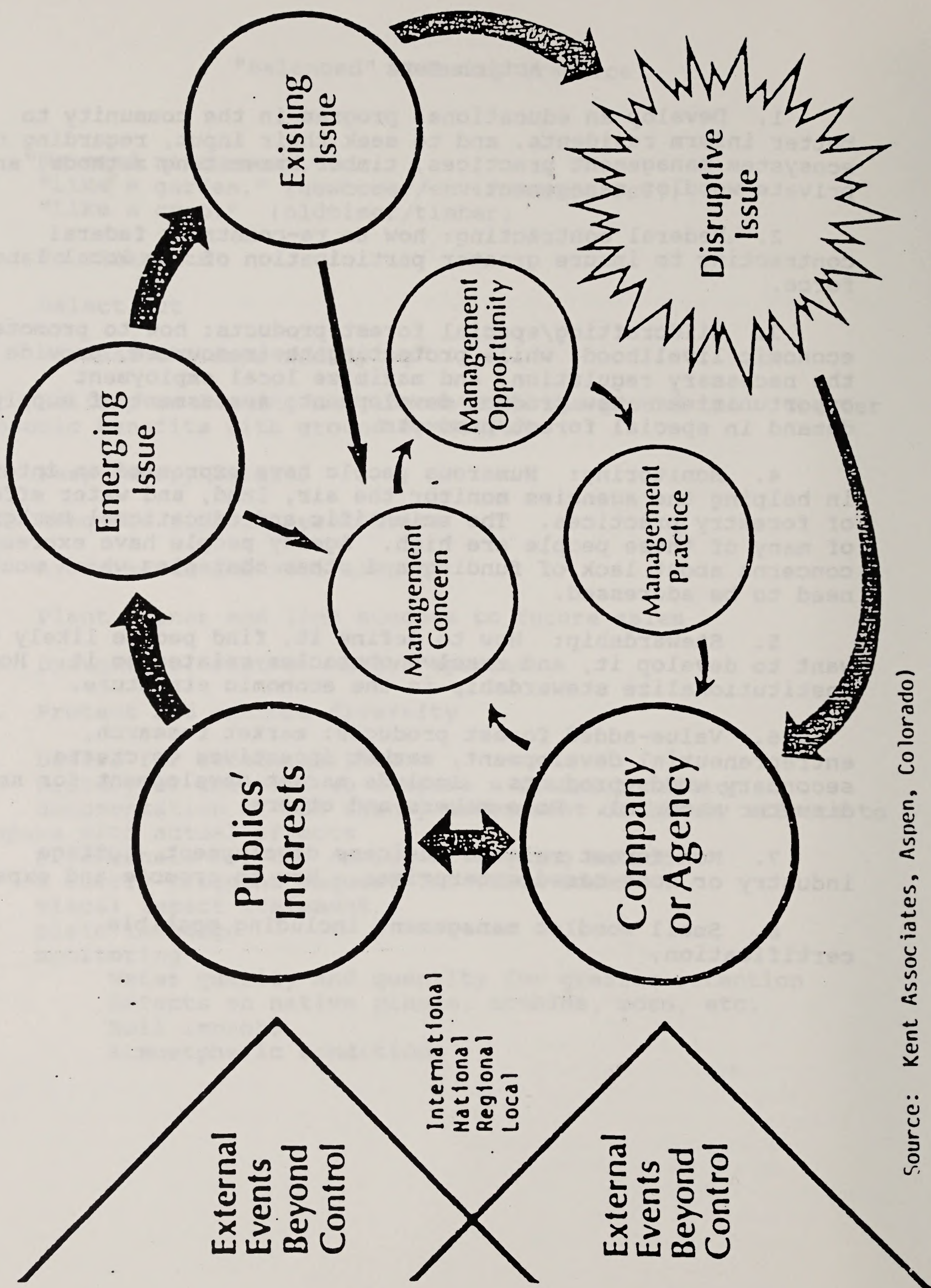
"Balanced" Forestry Practice

1. "We need management."
"Like a garden." (newcomer/environmentalist);
"Like a crop." (oldtimer/timber)
2. No clearcuts
3. Select cut
4. Harvest the dead and dying.
5. Helicopter logging but innovate on the ground too. Greater economic benefits with ground operations.
6. Keep canopy intact.
7. Adequate riparian protection
8. Avoid south and west slopes
9. Plant sooner and link success to future sales
10. Drought tolerant or native species
11. Protect and enhance diversity
12. Desire for accountability:
history of the site to compare w future condition
documentation of the agency assessment of likely effects to
compare with actual effects
a rationale for the choice of logging methods
a fairly frequent request for value-added
visual impact statement
plain language
monitoring
 Water quality and quantity for greater retention
 Effects on native plants, orchids, moss, etc.
 Soil impacts
 Atmospheric conditions

Action Sets

1. Develop an educational program in the community to better inform residents, and to seek their input, regarding new ecosystem management practices, timber harvesting methods, and private woodlot management.
2. Federal contracting: how to re-construct federal contracting to insure greater participation of the local labor force.
3. Wildcrafting/special forest products: how to promote economic livelihood, while protecting the resources, provide for the necessary regulation, and maximize local employment opportunities. New product development: assessment of supply and demand in special forest products.
4. Monitoring: Numerous people have expressed an interest in helping the agencies monitor the air, land, and water effects of forestry practices. The scientific and educational background of many of these people are high. Agency people have expressed concerns about lack of funding and other obstacles which would need to be addressed.
5. Stewardship: How to define it, find people likely to want to develop it, and resolve obstacles related to it. How to institutionalize stewardship in the economic structure.
6. Value-added forest products: market research, entrepreneurial development, market incentives to create secondary woods products. Include market development for small diameter material. Pole makers and others.
7. Non-forest related business development, cottage industry or home-based enterprises. How to promote and expand.
8. Small woodlot management including possible certification.

HOW PUBLIC ISSUES DEVELOP



Source: Kent Associates, Aspen, Colorado)

Seven Cultural Descriptors
Used in the Community Assessment

Publics: A segment of the population or a group of people having common characteristics, interests, or some recognized demographic feature. Sample publics include agriculturalists, governmental bodies, homemakers, industries, landowners, loggers, miners, minorities, newcomers, preservationists, recreationalists, senior citizens, small businesses and youth.

Networks: A structured arrangement of individuals who support each other in predictable ways because of their commitment to a common purpose, their shared activities, or similar attitudes. There are two types of networks; those that are informal arrangements of individuals who join together to express their interests, and those that are formal arrangements of individuals who belong to an organization to represent their interests. Networks functioning locally as well as those influencing management from regional or national levels are included in this descriptor. Example of citizen networks include ranchers who assist each other in times of need, grassroots environmentalists with a common cause, or families who recreate together. Examples of formal organizations include a cattleman's association, or a recreational club.

Settlement Patterns: The distribution of a population in a geographic area, including the historical cycles of settlement. This descriptor identifies where a population resides and the type of settlement categorized by its centralized/dispersed, permanent/temporary, and year-round/seasonal characteristics. It also describes the major historical growth/non-growth cycles and the reasons for each successive wave of settlement.

Work Routines: The way in which people earn a living, including where and how. The types of employment, the skills needed, the wage levels, and the natural resources required in the process are used to generate a profile of a population's work routines. The opportunities for advancement, the business ownership patterns and the stability of employment activities are also elements of this descriptor.

Supporting Services: Any arrangement people use for taking care of each other, including the institutions serving a community and the caretaking activities of individuals. This descriptor emphasizes how supporting services and activities are provided. Commercial businesses, religious institutions, social welfare agencies, governmental organizations, and educational, medical and municipal facilities are all examples of support services. Caretaking activities include the ways people manage on a day-to-day basis using family, neighborhood, friendship or any other support system.

Recreational Activities: The way in which people use their leisure time. The recreational opportunities available, seasonality of activities, technologies involved, and money and time required are aspects of this descriptor. The frequency of local/non-local uses of recreational resources, the preferences of local/non-local users, and the location of the activities are also included.

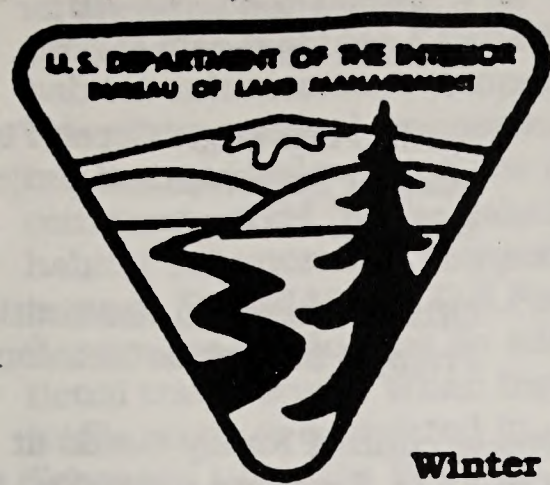
Geographic Boundaries: Any unique physical feature that defines the extent of a population's routine activities. Physical features generally separate the cultural identity and daily activity of a population from those living in other geographic areas. Geographic boundaries include geologic, biologic, and climatic features, distances, or any other characteristic that distinguishes one area from another. Examples of geographic boundaries include topographic features that isolate mountain valleys, distances that separate rural towns, or river basins that shape an agricultural way of life. Geographic boundaries may be relatively permanent or short-lived; over time, boundaries may dissolve as new settlement patterns develop and physical access to an area changes.

Source: This methodology has been developed and implemented by Kent Associates, Aspen, Colorado, during the last 25 years.

CONTACT NETWORKS TO

- **MONITOR CHANGING PUBLIC ATTITUDES AND ACTIVITIES**
- **IDENTIFY AND EVALUATE PUBLIC ISSUES**
- **DISPEL RUMORS ABOUT CORPORATE MANAGEMENT ACTIVITIES**
- **INFORM PUBLIC OF CURRENT AND FUTURE PLANS**
- **DISCUSS OPPORTUNITIES AVAILABLE TO ADDRESS ISSUES**
- **PREPARE FOR FORMAL PUBLIC PARTICIPATION AND NEWS RELEASES**

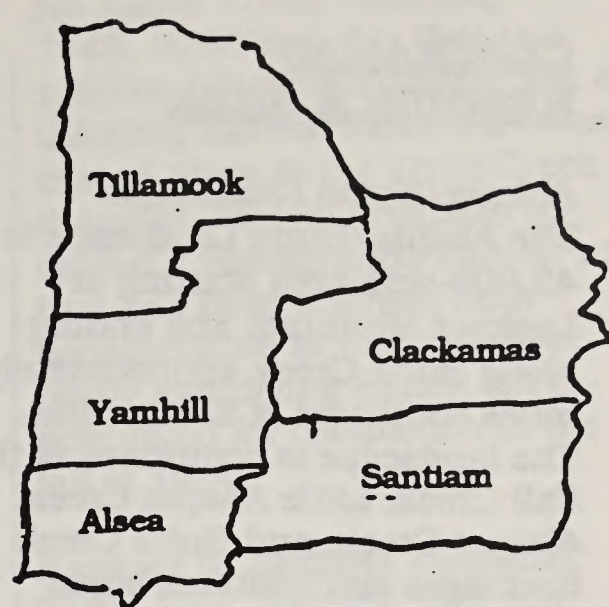
(Source: Kent Associates, Aspen, Colorado)



SALEM BLM Project Update

Winter 1993

Bureau of Land Management-Salem District



Ecosystem Management--Here to Stay

As indicated in the last Salem Project Update, the Bureau of Land Management (BLM) is aggressively moving toward an ecosystem-based approach to management of public lands and natural resources in Oregon and Washington. Ecosystem-based management was first proposed in the Draft Resource Management Plans released by all of the western Oregon BLM districts as the means to maintaining healthy, functioning ecosystems while providing a sustainable production of natural resources.

After the Forest Conference held by President Clinton on April 2, 1993 in Portland, the Forest Ecosystem Management Assessment Team was assembled to prepare and assess alternative strategies that applied an ecosystem approach to forest management. Their report was incorporated into a Draft Supplemental Environmental Impact Statement which was released for public review in July of 1993. The comment period for the draft document ended on October 28, 1993.

The BLM and U.S. Forest Service are now analyzing the comments received on that document. Once the comments are analyzed and the Final Supplemental Environmental Impact Statement is prepared, Bruce Babbitt, Secretary of the Interior, and Mike Espy, Secretary of Agriculture, will sign the Record of Decision setting the course for total forest ecosystem management for both agencies.

The BLM will adopt all elements of the Forest Plan and incorporate them into the Final Resource Management Plans for BLM's Western Oregon Districts and the Klamath Falls Resource Area.

At the Landscape Level:

Whatever form the final decisions take, management of the public lands on an ecosystem basis is here to stay. The Forest Plan and the Final Resource Management Plans (RMP) will establish objectives and land use allocations at a relatively broad level. Under ecosystem-based management, implementation is best accomplished at the landscape level. Management at a landscape level, which is watershed-based, considers all components of the ecosystem along with social and economic values to arrive at a desired future condition for the resources contained within the particular landscape. Analysis at a landscape level considers resource condition in the entire landscape, regardless of land ownership or jurisdictional boundaries and then sets resource objectives for the landscape based on ecosystem condition and management objectives of the respective landowners as well as those outlined in the Forest Plan or the Final RMP.

The process obviously will require more coordination with landowners and other land management agencies that have lands within those landscapes. It is our ultimate goal to work collaboratively with those sharing the landscape to ensure the continued health of the forest ecosystem along with meeting management objectives outlined in the plans.

With this in mind, in this issue of Salem Project Update we would like to solicit your involvement in the preliminary planning in a number of landscapes on the Salem District. We have provided a list of landscapes on which we will focus our efforts for the next year and a contact person for the resource area that will be leading the landscape-level analysis. We are excited about the possibilities this may hold for management of public lands in the Salem District. We encourage you to contact them to find out more about taking an ecosystem-based approach to management of public lands, and how you can be involved in the landscape level analysis process.

CLACKAMAS **RESOURCE AREA**

Abiqua/Butte Landscape

The Abiqua/Butte Landscape is a 42,000-acre area starting at Lookout Mountain and ending along Butte Creek approximately 5 miles southeast of Scotts Mills. The landscape is comprised of the Fall Creek, Little Abiqua Creek, Abiqua Creek, and Butte Creek drainages and contains lands managed by BLM, State of Oregon, private timber companies, and other landowners. Some of the activities being considered for the landscape include the following:

Looney Creek Thin Timber Sale planned for sale in 1994 in T7S, R2E, Sec. 25.

Regeneration harvests for 1995 in various locations.

Watershed Restoration Projects in the Butte Creek and Abiqua Creek basins.

Please contact John Barber at 375-5671 if you are interested in defining issues and objectives or providing information that may help us in our analysis.

Gordon Creek Landscape

The Gordon Creek Landscape is a 29,000-acre area starting at Larch Mountain and ending along the Sandy River approximately 4 miles southeast of Troutdale. The landscape is comprised of the Buck Creek, Gordon Creek, Pounder Creek, Walker Creek and Sandy River Frontal drainages and contains lands managed by BLM, U.S.Forest Service, Clackamas County, private timber companies, and other landowners. Some of the activities being considered for the landscape include the following:

Density Management Study in T1S, R5E, Sec. 1 and 13.

Regeneration harvest for 1995 in T1S, R4E, Sec. 7.

Management of Larch Mountain Outdoor Educational Area in T1S, R5E, Sec. 3.

Please contact Sam Caliva at 375-5672 if you are interested in defining issues and objectives or providing information that may help in our analysis.

Upper Clear Landscape

The Upper Clear Creek Landscape is a 18,200-acre area starting at Goat Mountain and ending along Clear Creek approximately 5 miles south of Estacada. The landscape is comprised of the Clear Creek, Little Clear Creek and Little Cedar Creek drainages and contains lands managed by BLM, U.S.Forest Service, private timber companies, and other landowners. Some of the activities being considered for the landscape include the following:

Clear Creek Thin Timber Sale planned for 1994 in T4S, R4E, Sec. 35, and T5S, R4E, Sec. 2.

Watershed Restoration Projects in the Clear Creek and Little Clear Creek basins.

Please contact Jim Irving at 375-5671 if you are interested in defining issues and objectives or providing information that may help in our analysis.

Eagle Landscape

The Eagle Landscape is a 41,445-acre area starting near Squaw Mountain and ending along Eagle Creek approximately 5 miles east of Estacada. The landscape is comprised of the Delph Creek, Grabenheim Creek, North, South and main stems of Eagle Creek drainages and contains lands managed by BLM, U.S.Forest Service, private timber companies, and other landowners. Some of the activities being considered for the landscape include the following:

Density Management Study in T3S, R5E, Sec. 35.

Regeneration harvests for 1995 in various locations.

North Fork Eagle Creek Fish Habitat improvement project in 1994.

Other Watershed Restoration Projects in various locations.

Please contact Randy Gould at 375-5671 if you are interested in defining issues and objectives or providing information that may help us in our analysis.

Beardsley Timber Exchange
T1S, R4E, Sec. 23 and 24. The parcels are located approximately 1/4 mile southwest of the junction of Gordon Creek and Trout Creek roads, 5 miles southwest of Corbett in Multnomah County. The parcels are adjacent to the east side of the BLM Sandy River Gorge Area of Critical Environmental Concern. Mr. J. Beardsley proposes to exchange approximately 81 acres of land in three parcels near the Wild and Scenic Sandy River for an equivalent value of BLM commercial timber in eastern Multnomah County. The BLM would retain land management responsibilities for the land. We are accepting input for developing alternatives and evaluating effects. Environmental assessment target completion date is spring of 1994. Contact: Bob Ratcliffe (375-5669)

Cascade Streamwatch

T2S, R7E, Sec. 31. Wildwood Recreation Site, on Hwy 26, 1/2 mile west of Welches. The proposal is to develop an environmental education center, fish viewing structures and related trails focusing on aquatic habitat, watersheds and fisheries. Cascade Streamwatch will be an innovative complex primarily designed to meet the needs of school groups and other visitors. The BLM and the Mt. Hood National Forest share coordination of the planning, design, construction and operation

of the proposed project. The project also includes a fisheries habitat enhancement component. The environmental assessment has been completed and the public comment period for the fisheries habitat enhancement component is over. The BLM and U.S. Forest Service are conducting an additional traffic study. When the traffic study is completed in February 1994, the BLM will issue a final decision and open an additional 30 day public comment period for the project. Contact: Bob Ratcliffe (375-5669)

ALSEA RESOURCE AREA

The Alsea Resource Area is planning to complete landscape analysis of three watersheds next year. If you are interested in defining issues and objectives or providing information on the analysis areas, contact David Haney at 375-5667.

South Fork Alsea Landscape

The South Fork Alsea Landscape is a 40,350-acre area encompassing the whole South Fork Alsea River drainage. The landscape includes Peak Creek, Rock Creek, Tobe Creek, and Bummer Creek drainages and contains lands managed by the BLM and private timber companies. Some activities being considered for this landscape and discussed below include:

- Super Hammer Thinning
- No Name Trout Thinning
- Tobe Creek Fisheries Enhancement
- South Fork Mountain Bike Trail
- Expanded hiking trails

North Fork Alsea Landscape

The North Fork Alsea Landscape is a 41,750-acre area encompassing the whole North Fork Alsea River drainage. The landscape includes Honeygrove, Crooked Creek, Parker Creek, Sweethome Creek, Racks Creek, and Easter Creek drainages and contains lands managed by the BLM and private

timber companies. Some activities being considered for this landscape and discussed below include:

- Earnest Creek Thinning
- Aloha Honeygrove Thinning
- Corvallis-to-the-Sea Trail

Lobster Creek Landscape

The Lobster Creek Landscape is a 37,350-acre area encompassing the Lobster Creek and Little Lobster Creek drainages. Lands are managed by the BLM, U.S. Forest Service, and private timber companies. Some activities being considered for this landscape and discussed below include:

- Lobster Creek Riparian Enhancement
- East Fork Lobster Creek Fisheries Enhancement (decision signed February 1, 1993)
- J-Line COPE stream studies

The Alsea Resource Area is preparing environmental assessments (EA) for the following proposed timber harvest projects. The first four projects are commercial thinnings that would be designed to increase the value and volume of timber to be harvested from the site by reducing the number of trees per acre. Target stands are overstocked Douglas-fir forests between 30 and 60 years of age. For more information contact David Haney (375-5667).

Super Hammer Thinning

T13S, R8E, Sec. 5 and 8. This is a proposed thinning and density management sale located 2 1/2 miles west of Glenbrook in Benton County in the Hammer Creek and South Fork Alsea drainages. Approximately 300 acres are being analyzed for thinning potential. Issues and alternative development have been completed. The EA is scheduled for completion in the spring of 1994.

No Name Trout Thinning
T14S, R7W, Sec. 11. This is a proposed density management or thinning harvest located 5 miles east of Alsea in the Trout Creek drainage. Project originally included a regeneration harvest area that has been dropped from consideration at this time. Currently identifying issues. EA is scheduled for completion in the fall of 1994.

Harvest in Earnest Thinning

T13S, R7W, Sec. 23. This is a proposed commercial thinning project located 10 miles southwest of Philomath in Benton County near Flat Mountain. Currently identifying issues. EA is scheduled for completion in the fall of 1994.

Aloha Honeygrove Thinning

T13S, R7W, Sec. 35. This is a proposed thinning harvest located 5 miles east of Alsea in the Honeygrove Creek drainage. Currently identifying issues. This sale was originally proposed as a regeneration harvest but that portion of the project has been dropped from consideration at this time. EA is scheduled for completion in the winter of 1995.

Final Beaver Timber Sale

T13S, R6W, Sec. 21. Proposed regeneration harvest originally proposed as a 1992 timber sale. Located in the Beaver Creek drainage approximately 9 miles south of Philomath. Project includes experimental patch harvest areas designed in conjunction with an Oregon State University study. Sale is being redesigned to incorporate new wildlife and stream protection guidelines in accordance with expected changes in the Final RMP.

Bull Run Head Timber Sale

T12S, R9W, Sec. 35. Proposed regeneration harvest of 42 acres originally proposed as a 1993 timber sale. Harvest area is 15 miles northwest of Alsea in Lincoln County. EA has been completed but will be amended after completion of Final RMP.

Enhancement

Located along various portions of Lobster Creek, approximately 1 mile total, in Lane County. Project will be designed to return conifer species to the riparian zone and provide a long term source of woody debris to the stream. EA has been completed and public comments are being accepted until December 3, 1993. Decision is expected soon after public comment period ends. Contact: Linda Conley (375-5681)

Tobe Creek Fisheries Enhancement Project

Located along Tobe Creek, approximately 1 mile total, 4 miles south of Alsea in Benton county. Purpose will be to increase number of pools, improve spawning habitat and provide off-channel rearing habitat for salmonids. Part of this project may include maintenance of existing structures placed in this stream 10 years ago. Currently scoping and designing alternatives. Contact: Effie Frazier (375-5667)

South Fork Alsea Back Country Byway Recreation Management Plan

Project area includes the South Fork Alsea River Basin along the access road and includes the developed recreation sites at Alsea Falls. Currently accepting public input on potential new trail development including hiking, mountain biking, equestrian, interpretive signing, camping and a trail connection between the South Fork Byway and the proposed Hult Reservoir Recreation Area. Contact: Doug Maxwell (375-5670)

South Fork Alsea Mountain Bike Trail Development

T14S, R7W, Sec. 36. This project includes a proposal to develop mountain bike trails near Alsea Falls campground. Trails would be either newly built or follow old logging roads. Various levels of riding expertise would be accommodated. Currently identifying

Doug Maxwell (375-5670)

Corvallis-to-the-Sea Trail Project

The Corvallis-to-the-Sea Trail would establish a 100 mile recreational corridor that would link Marys Peak Recreation Area, Cape Perpetua Scenic Area, Cape Mountain Equestrian Area, the urban areas of Corvallis, Philomath, and Yachats, developed recreation sites, a visitor center, and other recreational trails. The multiple-use (hiker, mountain biker, and horseback rider) pathway would link the Oregon Coast to the Willamette Valley. The route would utilize prior investment strategies, low-traffic forest roads, non-motorized forest roads, and trails with legal public access. Contact: David Rukke (375-5667)

Manual Maintenance of Competing Vegetation

Approximately 500 acres of scattered lands located throughout the Alsea Resource Area would be treated. Project involves using chainsaws to cut brush and hardwood species competing with the establishment and survival of young conifer plantations. A categorical exclusion review will be completed prior to implementation in the summer of 1994. Contact: Colin Rabe (375-5625)

YAMHILL RESOURCE AREA

For additional information please contact Jeff Kovach at 375-5686.

Public involvement is encouraged to help define issues and objectives for the following Landscape Analysis Units:

Upper Siletz Landscape

This 14,000 acre landscape includes the Valsetz townsite and encompasses the South Fork Siletz drainage. This drainage includes lands managed by the BLM and private timber companies. Activities being considered for this landscape include the Callahan Creek proposal mentioned below.

This 42,000 acre landscape is located several miles upstream from the town of Yamhill and encompasses the North Yamhill River, Turner Creek and Haskins Creek. This drainage includes lands managed by the BLM, private timber companies, and numerous agriculture/woodlot landowners. Activities being considered for this landscape include thinning of young (40-60 year-old) Douglas-fir.

The following timber sale is proposed for sale in 1994:

Cedar Creek

T2S, R5W, Sec. 17. Three miles northwest of Pike along Cedar Creek Road. Commercial thinning 137 acres of 50 year-old Douglas-fir. Cable and tractor yarding proposed, 1 mile of road renovation, 1/2 mile road construction.

The environmental assessment and Finding Of No Significant Impact will be available for public comment at the BLM Salem District Office reception desk from November 17 to December 16. Decision Record is anticipated December 20, 1993.

Environmental assessment is currently being prepared for the following proposed 1994 timber sale:

Callahan

T8S, R7W, Sec. 31. Two miles east of the old Valsetz townsite. Two density management cuts of 16 and 24 acres; three commercial thin cuts of 10, 18 and 22 acres; and four patch cuts of 3, 1, and 1 acres in 70 year-old Douglas-fir. Cable and tractor yarding being considered.

Public input for developing alternatives and evaluating effects are being accepted for the following commercial thinning sales in 40-50 year old Douglas-fir:

Panting Panther

T3S, R6W, Sec. 13, 23, and 24. Ten miles west of Carlton up Meadow Creek Road, along Nestucca Road. Three thinning cuts totaling 75 acres. Tractor yarding and short spur construction to keep operations off Nestucca Road, being considered.

Glazed Teal

T8S, R6W, Sec. 31. Four miles southwest of Falls City up Teal Creek Road. One thinning cut of 150 acres. Tractor and cable yarding. 1/2 mile of road construction being considered.

Stoned Gopher

T4S, R6W, Sec. 10 and 23; T4S, R7W, Sec. 24. Nine and 14 miles north of Sheridan up Gopher Valley Road near Stoney Mountain. Ten miles up Willamina Creek Road. Three thinning cuts totaling 130 acres. Tractor and cable yarding. 1 mile of road construction being considered.

North Fork Siletz River and Boulder Creek

T7S, R8W, Sec. 32. The proposal is to replace two condemned log stringer bridges, one on the North Fork Siletz River and one on Boulder Creek. The objectives of the proposal are to provide access for recreational opportunities, scientific research and other land management activities to 3,600 acres of private and BLM administered land. Valley of the Giants Outstanding Natural Area is located approximately 1 mile above Siletz River bridge.

The following proposals will be reviewed for categorical exclusion:

Manual Maintenance

Manual cutting of competing shrubs and hardwoods in approximately 400 acres of young conifer stands scattered throughout the resource area.

Pruning

Removal of the lower branches of selected Douglas-fir trees to promote the production of high quality clear wood in the Willamina and McMinville areas.

Progeny Test Site Maintenance

Trapping pocket gophers and mountain beavers, and cutting competing vegetation around conifers inside progeny test sites throughout the resource area.

TILLAMOOK **RESOURCE AREA**

Nestucca Basin Landscape

This landscape analysis will focus on many of the ecological processes occurring within the Nestucca River watershed. The analysis will cover approximately 165,000 acres of U.S. Forest Service, BLM, State of Oregon and private lands.

East Fork of the Nehalem River Landscape

This landscape analysis will focus on many of the ecological processes occurring within the East Fork of the Nehalem River watershed. The analysis will cover approximately 20,500 acres of BLM and private lands.

Scappoose Creek Landscape

This landscape analysis will focus on many of the ecological processes occurring within the Scappoose Creek watershed. The analysis will cover approximately 40,800 acres of BLM and private lands.

Please contact Gregg Kirkpatrick at (503) 842-7546 if you are interested in the development of a landscape level analysis or providing information that may help us in our analysis.

Public input for developing alternatives and evaluating effects are being accepted for the following proposals. Contact Gregg Kirkpatrick (842-7546).

Bear Creek Fisheries Enhancement

Located in T3S, R7W, Sec. 29 and 32. This proposal would improve the stream conditions through construction of pools and side channels for anadromous fish production on approximately 1 mile of the lower end of Bear Creek, a tributary of the Nestucca River.

Muletail Density Management Treatment

Located in T4S, R7W, Sec. 19. This proposal would thin approximately 120 acres of timber land to varying densities on an average of 30 trees per acre with a low of 20 trees per acre. The purpose of this project is to create conditions for future growth of a multi-storied stand of timber. This project is located within the Nestucca River Watershed.

Rye Mountain Density Management Treatment

Located in T4S, R7W, Sec. 9. This proposal would thin approximately 123 acres of timber land to an average of 90 trees per acre. The purpose of this project is to enhance growth and wind firmness on the residual stand. This project is located within the Nestucca River Watershed.

Kenusk Creek Commercial Thinning:

Located in T4N, R3W, Sec. 5 and 7. This proposal would thin approximately 120 acres of commercial timber land to an average of 100 trees per acre. The purpose of this project is to enhance growth and wind firmness on the residual stand. This project is located within the East Fork of the Nehalem River Watershed.

The following proposals will be reviewed for categorical exclusion:

Mountain beaver trapping

Trapping mountain beavers in selected reforestation units throughout the Tillamook Resource Area to maintain conifer stocking. Approximately 200 acres are planned for trapping. The proposed start work date will be June 1, 1994. Contact: Kent Mortensen (842-7546).

Progeny Site Maintenance

T4N, R3W, Sec. 21; T4N, R2W, Sec. 32; T3N, R3W, Sec. 21; T1S, R8W, Sec. 30; T3S, R6W, Sec. 31; T3S, R7W, Sec. 19; and T4S, R7W, Sec. 16. Trapping pocket gophers and mountain beavers, and cutting woody and herbaceous vegetation in and around the edges of seven progeny test sites to maintain relatively uniform conditions around test trees. Three sites (30 acres) are planned for pocket gopher trapping; seven sites (80 acres) are planned for mountain beaver trapping; and vegetation cutting is planned for seven sites (80 acres). The proposed start work date will be May 1, 1994. Contact: Kent Mortensen or Kurt Heckerroth (842-7546).

Cone collection

Collection of cones from selected conifer and hardwood trees throughout the Tillamook Resource Area to serve as a source of seed for reforestation. The amount of seed collected will depend on the cone crop that develops. The proposed start work date will be September 1, 1994. Contact: Stuart Hoffman (842-7546).

Stand Maintenance

Cut competing shrubs and hardwoods from around conifer trees in plantations. Approximately 600 acres are proposed for treatment. The proposed start work date will be June 1, 1994. Contact: Stuart Hoffman (842-7546).

Riparian Site Preparation, Tree Planting, and Tubing

T3S, R7W, Sec. 8, 9, 17, 18, and 21. The proposal would reestablish conifers in an alder-dominated riparian area. The purpose is to enhance wildlife habitat and provide a future source of large wood for stream structure. The project involves clearing alder and brush, planting a mixture of conifers, and protecting them from animal damage. Accepting comments on the EA until December 22, 1993. Decision will be made after reviewing comments. Contact: George Kral (842-7546).

SANTIAM**RESOURCE AREA****Hamilton Creek Landscape**

The Hamilton Creek Landscape is located in T12S, R1E and R2E, approximately 6 miles northeast of Sweet Home, encompassing 22,000 acres in the upper Hamilton Creek and Scott Creek drainages. The landscape contains lands managed by the BLM and private timber companies. Some of the activities being considered for the landscape include the following:

Density Management Study and commercial thinning in T12S, R1E, Sec. 13 and 15, and T12S, R2E, Sec. 29.

Watershed Restoration projects in various locations

Precommercial thinning for 1994 in undetermined locations.

Road Management Plan development for BLM administered lands.

Manual maintenance for 1994 in various locations.

Lower Thomas Creek Landscape

The Lower Thomas Creek Landscape is located in T9S and T10S, R1E and R2E, south of Lyons and Mehama. The landscape encompasses 26,000 acres in the Thomas Creek drainage, upstream from Jordan Creek approximately 8 miles to Indian Prairie Creek and south to Thomas Cairn/Snow Peak. The landscape includes lands managed by the BLM, private timber companies, and other private landowners. Some of the activities being considered for the landscape include the following:

Watershed Restoration projects in various locations.

Precommercial thinning for 1994 in undetermined locations.

Commercial thinning for 1994 or 1995 in T10S, R2E, Sec. 5

Road Management Plan development for BLM administered lands.

Manual maintenance for 1994 in various locations.

Please contact Wayne Barney at (503) 375-5677 if you are interested in the development of the landscape level analysis for either of these landscapes, or providing information that may help us in our analysis.

The following proposals will be reviewed for categorical exclusions. Contact: Diane Morris or Ed Sarui (375-5684)

Progeny Test Site Maintenance
T12S, R1E, Sec. 3.

Remove competing brush using brushcutters in progeny test sites.

Trapping

Located on two 10-acre sites in progeny test sites trap for mountain beaver to control damage to test trees.

DISTRICT WIDE

Density Management Study

The Salem District is planning to implement a Density Management Study. Alternative silvicultural systems will be used to accelerate the development of old-growth characteristics in selected forest stands. The study will provide a basis for monitoring and adaptive management. Procedures for monitoring botanical, wildlife and riparian resources will be established. Similar studies have been instituted in various parts of the Pacific Northwest; these would be among the first implemented on BLM lands.

Implementation of the study will begin in the Cascade Range with the Coast Range to follow. Site selection for the study is ongoing, with candidate stands located in the following areas:

Clackamas Resource Area

Gordon Creek Landscape Analysis Unit

T1S, R5E, Sec. 1
T1S, R5E, Sec. 13

Santiam Resource Area

Hamilton Creek Landscape Analysis Unit

T12S, R1E, Sec. 13
T12S, R1E, Sec. 25
T12S, R2E, Sec. 29

Contact: Charlie Thompson
(375-5628)

Nestucca Loop National Back Country Byway

T3S, R6W, Sec. 8, 13, 14, 15, 16, 17, 20, 28, 29, 31; T3S, R7W, Sec. 31; T4S, R7W, Sec. 1, 6, 7, 8, 11, 12, 15, 17, 21, 22. Located in the Yamhill and Tillamook Resource Areas. The Nestucca River National Back Country Byway" (designated in 1989) would be amended by adding 28.6 miles of roadway to the existing byway and would change the existing name to "Nestucca Loop National Back Country Byway. The roads to be added are: the east and west ends of the Nestucca River Road within BLM management (10 miles); Bald Mountain Road from the intersection with Nestucca River Road to the intersection with Bible Creek Road (13.4 miles); Bible Creek Road from the intersection with Bald Mountain Road to the intersection with Nestucca River Road (5.2 miles). The environmental assessment is available at the Salem District and Tillamook Resource Area Offices for review. Comments are welcome until January 30, 1994. A decision will be issued after review of comments. Contact: Lynn Trost (842-7546)

Special Forest Products Program for 1994.

A categorical exclusion review will be completed for collection of special forest products in unrestricted areas within the district. Special provisions and harvesting instructions have been developed for all special forest products. Contact the respective resource area for information about special forest products. Contact: Belle Foti (375-5616) concerning the review process.

For More Information

Contact:

Salem BLM

1717 Fabry Road SE

Salem, Oregon 97306

503-375-5646

Open: 7:30 am to 4 pm (Monday-Friday)

or

Tillamook Resource Area

4610 Third Street

Tillamook, Oregon 97141

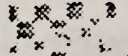
503-842-7546

Open 7:30 am to 4 pm (Monday-Friday)

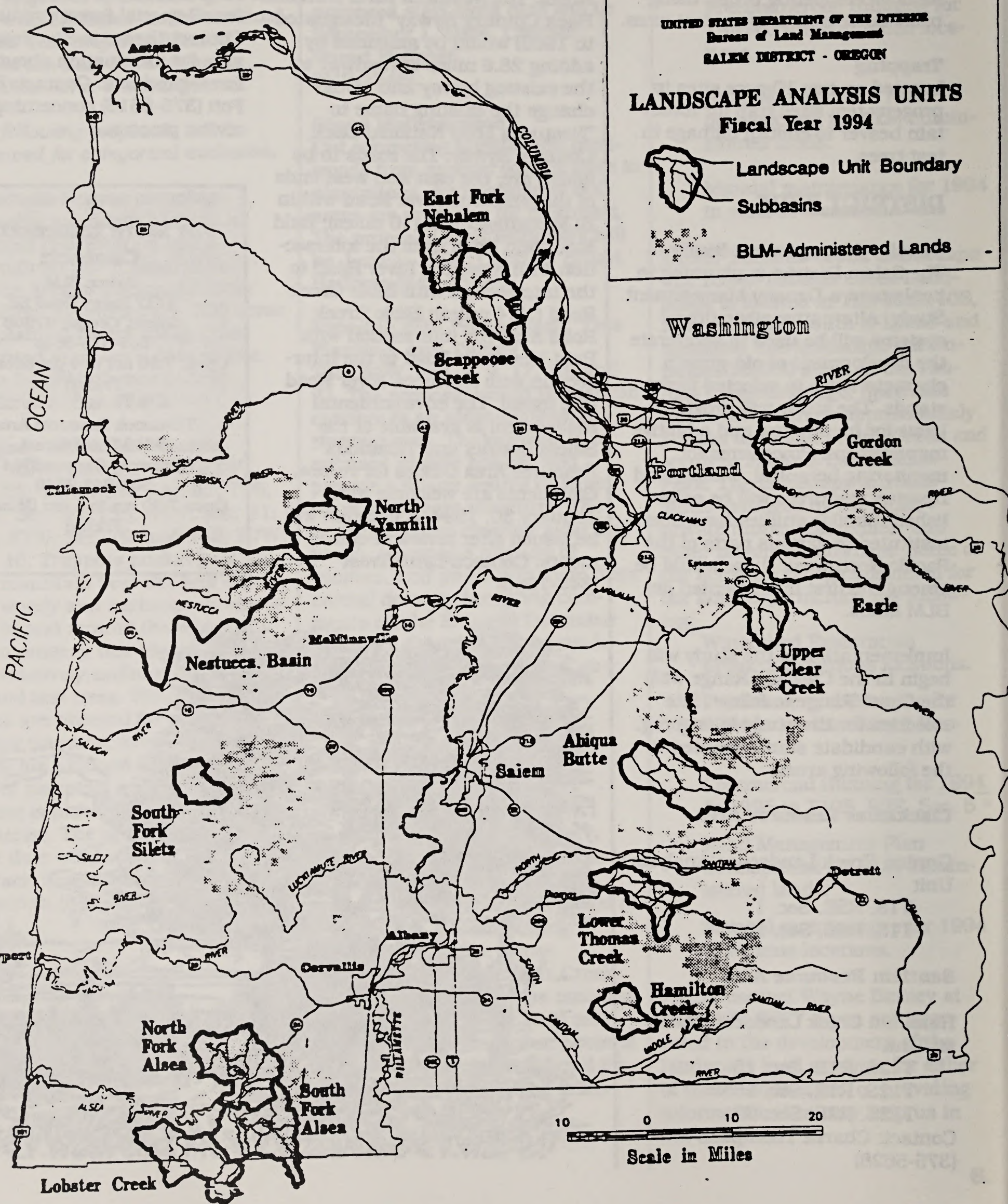


UNITED STATES DEPARTMENT OF THE INTERIOR
Bureau of Land Management
SALEM DISTRICT - OREGON

LANDSCAPE ANALYSIS UNITS Fiscal Year 1994

-  Landscape Unit Boundary
-  Subbasins
-  BLM-Administered Lands

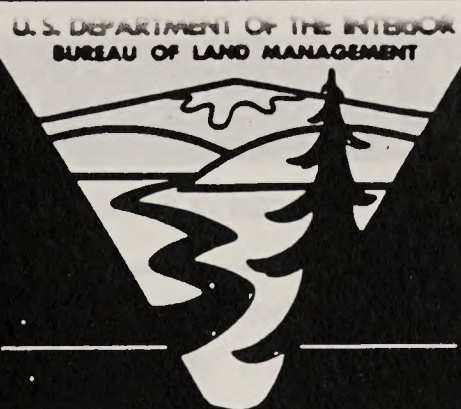
T8N
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R11W R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R

BLM

Eugene District Project and Planning Focus



WINTER 1994

Introduction

Our first newsletter was a success, initiating positive comments about being informed on proposed projects. We want to continue this effort and encourage you to get involved with a proposed project you are interested in or concerned about.

In this newsletter we have introduced the concept of Watershed Analysis. This process is very critical to implementing the objectives of the Final Supplemental Environmental Impact Statement (FSEIS) and BLM's Final Resource Management Plan (FRMP). We currently are working on the preliminary parts of the Watershed Analysis and will continue this process so that implementation of our Final RMP/EIS will be a smooth transition. By February 15, 1994 more detailed guidance addressing Watershed Analysis will be available and a special edition of this newsletter will go out at that time. If, after reading our explanation of Landscape or Watershed Analysis you still have questions on this subject or wish more clarification, our resident expert, Dan Howells, can help you.

District Manager

Judy Ellen Nelson

What is Landscape or Watershed Analysis?

As described in the Forest Ecosystem Management Assessment Team (FEMAT) report (pg. V-53),

"Watershed analysis is a systematic procedure for characterizing watersheds and their ecological processes to meet specific management and social objectives. This information then guides management prescriptions, including setting and refining boundaries of Riparian Reserves, sets restoration strategies and priorities, and reveals the most useful indicators for monitoring environmental change. Watershed analysis is a stratum of ecosystem planning applied to watersheds of approximately 20-200 miles. It is a key component in watershed planning, a process for melding social expectations with the biophysical capabilities of specific landscapes".

The intent is to analyze major ecological processes at work in and between areas identified by watersheds and to identify past, current, and potential future conditions and functions of sensitive components like fish, soils, and some plant and animal species. An end result of watershed analysis is a set of biophysical thresholds against which proposed management activities can be evaluated. The analysis allows for better integration in space and time of ecological processes, social needs and concerns, and proposed future activities.

Who Does Watershed Analysis and How is it Coordinated ?

BLM began this watershed analysis process prior to the July 1993 Draft Supplemental Environmental Impact Statement.

Watershed analysis is done by an interdisciplinary team of specialists who are familiar with the area. Specialists may include a forester/botanist, geologist/hydrologist, ecologist/fish biologist, and wildlife biologist and other individuals and/or groups will be involved in developing specific management and social objectives.

Upon agreement with private landowners watershed analysis will be as coordinated as possible between public and private lands so that the majority of lands in any given basin can be considered. The sharing of information and data to prepare a consolidated analysis is the overall focus of coordination between owners.

Is this a Short-Term, Temporary Project?

Watershed analysis is not a short term or temporary project. Watershed analysis will help provide a basis for all Federal land management planning and activities and impact assessment in the future. Completed analyses will be viewed as dynamic efforts that will be subject to periodic revision and updating. The update process will be used to capture changes in data, information, and review the results of project level monitoring.

How Does Watershed Analysis Fit into the Draft Supplemental EIS?

Watershed analysis is included in all alternatives of the Draft SEIS through adoption of the Aquatic Conservation Strategy recommended in the Forest Ecosystem Management Assessment Team (FEMAT) report. It is referenced in Appendix B, Additional Information on Standards and Guidelines of the supplemental EIS.

Current District Projects and Planning Efforts

DISTRICT-WIDE

Density Management Study

Contact: Dan Howells or Norm Gartley

Location:

South Valley Resource Area

Township 20 South, Range 4 West, Section 35

Township 21 South, Range 4 West, Section 35

Township 21 South, Range 4 West, Section 5

- * Township 21 South, Range 5 West, Section 1

McKenzie Resource Area

- * Township 16 South, Range 1 West, Section 27

Township 18 South, Range 1 West, Section 9

Township 20 South, Range 1 West, Section 17

- * Initial sites for Proposed Action

The Eugene District is planning to implement a Density Management Study. This study will test the use of alternative silvicultural systems to accelerate the development of oldgrowth characteristics in young forest stands. The study will provide a basis for monitoring and adaptive management. Procedures for monitoring botanical, wildlife, and riparian resources will be established. Similar studies have been instituted in various parts of the Pacific Northwest, and these would be among the first such installations on BLM lands.

Implementation of the study will begin in the Cascade Range, with subsequent installations in the Coast Range. Site selection for the study is ongoing, with the locations of candidate stands already mentioned. Final site selections will be made by January and site specific Environmental Assessments will be prepared for selected study sites.

Information Update: Final Resource Management Plan/Environmental Impact Study (RMP/FEIS)

Contact: Jon Strandjord

Location: Eugene District lands

The planning effort continues with the comment period for the Draft Supplemental EIS (SEIS) having ended on October 30, 1993. Some 112,000 comments were collected requiring Forest Service and BLM to ask for more time in order to process the comments. Following the analysis of these comments a Record of Decision will be signed on the Final Supplemental Environmental Impact Statement (FSEIS) by the Secretary of Interior and the Secretary of Agriculture setting the course of future forest management. BLM will then incorporate all elements of the FSEIS into the Final Resource Management Plans/EIS for BLM's

Western Oregon Districts. The new time frame now for completion of the FSEIS is March 30, 1994 followed by BLM releasing the final RMP /EIS this coming summer

McKENZIE RESOURCE AREA

Update: McKenzie River Recreation Plan

Contact: Lee Lauritzen or Liz Aleman

Location: BLM Lands Adjacent to the McKenzie River

This plan is for the future management of the Recreation Resource on public (BLM) lands and associated waterways within the McKenzie River corridor. The draft plan has been completed and is available for review. It documents future recreational opportunities including day use, hiking, interpretation, biking, and camping. Proposed developments and management are specified as being supportive of the existing natural environment. The EA target completion date is Feb/March 1994.

Public Land Sale

Contact: Steve Madsen

Location: T. 18 S., R. 1 W., Sec. 25

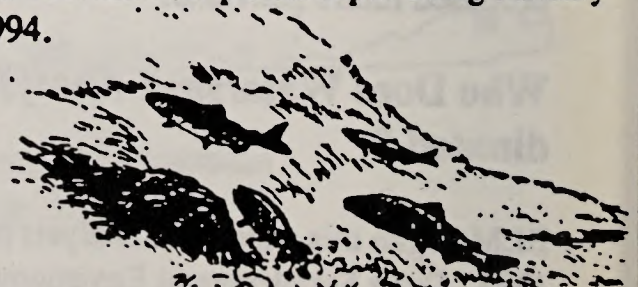
Public sale of approximately 2.89 acres of unpatented land. This parcel is approximately 4,875 feet in length and triangular in shape and is located approximately two miles east of Fall Creek. EA completion date is March 1994. Best time for input would be February 1994.

Bunker Hill Wildlife Pond

Contact: Raul Morales

Location: T. 15 S., R. 1 W., Sec. 27

A Proposed Action to construct a 3-4 acre pond that will enhance habitat for mammals, waterfowl and other birds, red-legged frogs (a Federal Candidate species), and other amphibians and reptiles. There is an existing 3-4 acre pond just north of this proposed project which together will make this area more attractive to wildlife. EA completion date is estimated to be the end of February 1994 with the best time for public input being January and early February 1994.



Blagden Wildlife Pond

Contact: Raul Morales

Location: T. 14 S., R. 2 W., Sec. 35

BLM proposes to improve an existing helipond which currently is non-functional and hazardous to wildlife in the area. The pond would be modified creating gentler slopes to allow wildlife access to the pond. Pond size would be increased to one acre. This pond will provide food, cover, and water to wildlife inhabiting this area. It may also provide breeding habitat for the red-legged frog (a Federal Candidate species). EA completion date is estimated to be February 1994 with the best time for public input in January 1994.

COAST RANGE RESOURCE AREA

BLM/International Paper Company Land Exchange -Update-

Contact: David Schroeder

Location: T. 18 S., R. 8 W., and T. 19 S., R. 7 W., in the vicinity of the BLM's Whittaker Creek and Clay Creek Recreation Sites west southwest of Eugene.

The purpose of the proposed land exchange is to block up land ownership for BLM and International Paper Company. Completion of the exchange will allow the BLM to acquire property adjacent to the two recreation sites and frontage on the Siuslaw River. The exchange involves approximately 200 acres of BLM land and 160 acres of International Paper Company Land. Target date for the EA completion is March 1994.

Lake Creek Firewood and Mushroom Log Area

Contact: John Peacher

Location: T. 15 S., R. 7 W., Sec. 15, 16, 17

A request for removal of overhanging alder and small conifers from road prisms extending 25-50 feet from road edge (starting at the junction of road number 15-7-15 & 15-7-35 and moving west on road number 15-7-35 for 2.5 miles). Material to be used for firewood and for mushroom logs. EA completion date March 1994.

Haynes Creek Easement

Contact: Haywood Banks

Location: T. 17 S., R. 7 W., Sec. 20

BLM proposes to obtain a non-exclusive easement across a 40 acre parcel to gain access to 610 acres of BLM public land. Estimated EA completion date is February 1994.

WEST EUGENE WETLANDS PROJECT

Land Exchange

Contact: Steve Madsen

Location: West Eugene Wetlands Area

A land exchange with Shelton-Turnbull Printing. Proposed Action will exchange approximately 2 acres of BLM land adjacent to the Shelton Turnbull property for similar property within the West Eugene Wetlands Project. Estimated EA completion date is March 1994. Ideal time for input would be February 1994.

SOUTH VALLEY RESOURCE AREA

Hobart Butte Quarry Expansion

Contact: Kris Ward

Location: T. 23 S., R. 4 W., Sec. 1

Douglas County Public Works requests free use of approximately 590,000 cubic yards of rock from the Hobart Butte Quarry. This site is located approximately 3 miles southwest of London Springs, Oregon. Douglas County would use about 300,000 cubic yards in about a 3-year period for construction of the dam at the Milltown Project.

Approximately 100,000 cubic yards would be used for associated construction for roads, parking and recreation areas. Douglas County proposes to use the remaining volume (190,000 c.y.) for road construction projects within the county over a 20-year period. Estimated EA target completion date is March 1994. The best time for public input is January 1994, and copies of the proposed development plan can be obtained from the contact person by calling (503) 683-6430.



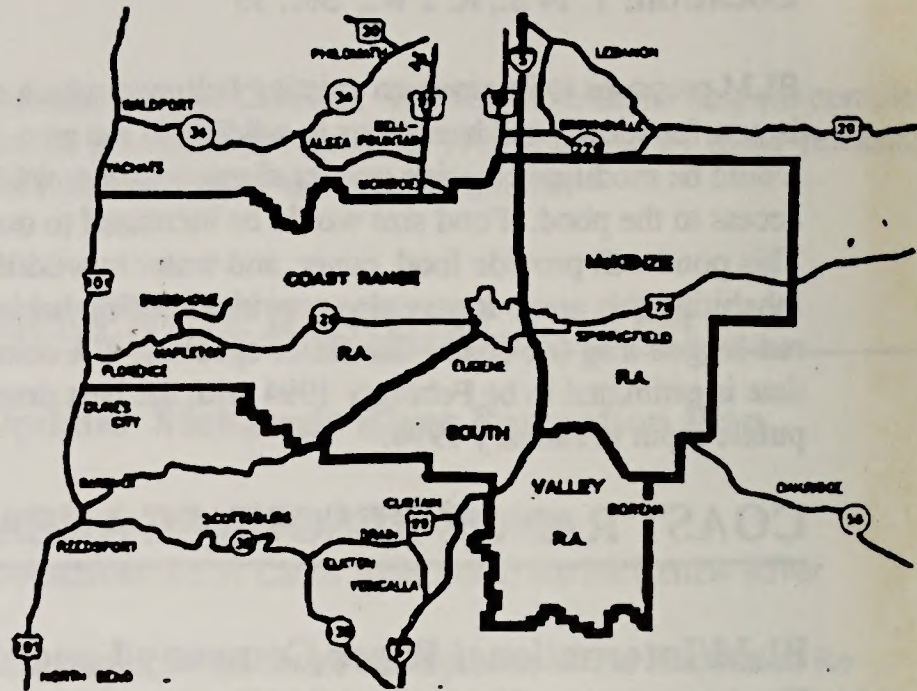
HOW CAN I HELP OR BE INVOLVED?

Please let us know your views and concerns on the Proposed Actions presented in this newsletter. Since the existing laws and regulations require BLM to be process oriented, you must be a part of the process if you want to influence a decision. Ideally, the earlier that you involve yourself in this process the better. If you have a question or want to get involved in a particular Proposed Project (or Action), please communicate your interest to the listed designated "contact person" at the address / phone number listed below:

BLM - Eugene District
2890 Chad Drive
P.O. Box 10226
Eugene, Oregon 97440

(503) 683-6600
7:45 A.M. to 4:15 P.M.
Monday through Friday

EUGENE DISTRICT MAP



Bureau of Land Management
Eugene District Office
2890 Chad Drive
P.O. Box 10226
Eugene, Oregon 97440



Eugene District
Project and Planning Focus

